COMMONWEALTH OF PENNSYLVANIA.

DEPARTMENT OF AGRICULTURE.

BULLETIN No. 164.

# PROCEEDINGS

OF THE

THIRTY-FIRST ANNUAL MEETING

OF THE

# Pennsylvania State Board of Agriculture.

HELD IN THE

NEW CAPITOL BUILDING, HARRISBURG, PA.

JANUARY 22 and 23, 1908.

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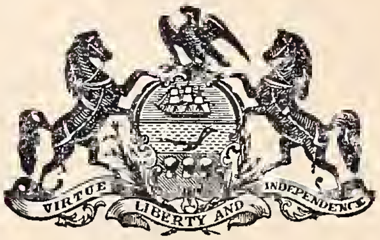
VIRTUE
LIBERTY AND
INDEPENDENCE

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# MEMBERS

OF THE

# PENNSYLVANIA STATE BOARD OF AGRICULTURE,

FOR THE YEAR 1908.

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## Members Ex-Officio.

HON. EDWIN S. STUART, Governor.
HON. HENRY HOUCK, Secretary of Internal Affairs.
DR. N. C. SCHAEFFER, Superintendent of Public Instruction.
DR. EDWIN EARLE SPARKS, President of the State College.
HON. ROBERT K. YOUNG, Auditor General.
HON. N. B. CRITCHFIELD, Secretary of Agriculture.

---

## Appointed by the Governor.

| | |
|---|---|
| Gen. James A. Beaver, Centre County, | Term expires 1910 |
| R. I. Young, Middletown, Dauphin County, | Term expires 1911 |
| R. H. Thomas, Jr., Mechanicsburg, Cumberland County, | Term expires 1912 |

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## Appointed by the State Poultry Association.

| | | |
|---|---|---|
| J. D. Nevius, | Philadelphia, | 1910 |

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## Elected by County Agricultural Societies.

| | | | Term expires. |
|---|---|---|---|
| Adams, | A. I. Weidner, | Arendtsville, | 1909 |
| Allegheny, | J. S. Burns, | Imperial, R. F. D. No. 1, | 1909 |
| Armstrong, | S. S. Blyholder, | Neale, | 1911 |
| Beaver, | A. L. McKibben, | New Sheffield, | 1911 |
| Bedford, | W. C. Lutz, | Bedford, | 1909 |
| Berks, | H. G. McGowan, | Geiger's Mills, | 1910 |
| Blair, | | | |
| Bradford, | Edwin Platt, | Wysox, | 1910 |
| Bucks, | | | |
| Butler, | | | |
| Cambria, | H. M. Gooderham, | Patton, R. F. D., | 1910 |
| Cameron, | | | |
| Carbon, | | | |
| Centre, | John A. Woodward, | Howard, | 1909 |
| Chester, | M. E. Conard, | Westgrove, | 1909 |
| Clarion, | S. X. McClellan, | Knox, | 1910 |
| Clearfield, | E. M. Davis, | Grampian, | 1910 |
| Clinton, | J. A. Herr, | Millhall, R. F. D., | 1911 |
| Columbia, | A. P. Young, | Millville, | 1909 |

| | | | Term expires. |
|---|---|---|---|
| Crawford, | J. F. Seavy, | Saegerstown, | 1911 |
| Cumberland, | Chas. H. Mullin, | Mt. Holly Springs, | 1909 |
| Dauphin, | | | |
| Delaware, | R. M. Heyburn, | Ward, | 1911 |
| Elk, | John M. Witman, | St. Mary's, | 1911 |
| Erie, | | | |
| Fayette, | | | |
| Forest, | | | |
| Franklin, | John P. Young, | Marion, | 1911 |
| Fulton, | J. L. Patterson, | McConnellsburg, | 1910 |
| Greene, | N. M. Biddle, | Carmichaels, | 1910 |
| Huntingdon, | Geo. G. Hutchison, | Warrior's Mark, | 1909 |
| Indiana, | S. M. McHenry, | Indiana, | 1910 |
| Jefferson, | Peter B. Cowan, | Brookville, | 1910 |
| Juniata, | Matthew Rodgers, | Mexico, | 1909 |
| Lackawanna, | Horace Seamans, | Factoryville, | 1910 |
| Lancaster, | | | |
| Lawrence, | Sam'l McCreary, | Volant, | 1909 |
| Lebanon, | H. C. Snavely, | Cleona, | 1910 |
| Lehigh, | P. S. Fenstermaker, | Allentown, | 1909 |
| Luzerne, | | | |
| Lycoming, | A. J. Kahler, | Hughesville, | 1909 |
| McKean, | | | |
| Mercer, | W. C. Black, | Mercer, | 1911 |
| Mifflin, | M. M. Naginey, | Milroy, | 1910 |
| Monroe, | R. F. Schwarz, | Analomink, | 1911 |
| Montgomery, | J. Sexton, | North Wales, | 1911 |
| Montour, | | | |
| Northampton, | W. F. Beck, | Easton, R. F. D., | 1909 |
| Northumberland, | I. A. Eschbach, | Milton, R. F. D., | 1911 |
| Perry, | A. T. Holman, | Millerstown, | 1910 |
| Philadelphia, | Edwin Lonsdale, | Girard College, Phila., | 1910 |
| Pike, | | | |
| Potter, | H. H. Hall, | Ellisburg, | 1909 |
| Schuylkill, | W. H. Stout, | Pinegrove, | 1910 |
| Snyder, | J. F. Boyer, | Freeburg, | 1909 |
| Somerset, | Jacob S. Miller, | Friedens, | 1908 |
| Sullivan, | E. R. Warburton, | Dushore, R. F. D., No. 3, | 1909 |
| Susquehanna, | Frank A. Davies, | Montrose, | 1910 |
| Tioga, | E. B. Dorsett, | Mansfield, | 1911 |
| Union, | J. Newton Glover, | Vicksburg, | 1911 |
| Venango, | | | |
| Warren, | R. J. Weld, | Sugargrove, | 1911 |
| Washington, | D. S. Taylor, | Burgettstown, | 1911 |
| Wayne, | Warren E. Perham, | Niagara, | 1910 |
| Westmoreland, | M. P. Shoemaker, | Greensburg, | 1910 |
| Wyoming, | D. A. Knuppenburg, | Lake Carey, | 1910 |
| York, | G. F. Barnes, | Rossville, | 1911 |

# OFFICERS.

## PRESIDENT.

| | |
|---|---|
| Hon. Edwin S. Stuart, Governor, | Harrisburg. |

## VICE PRESIDENTS.

| | |
|---|---|
| R. F. Schwarz, | Analomink. |
| G. G. Hutchison, | Warrior's Mark. |
| S. S. Blyholder, | Neale. |

## EXECUTIVE COMMITTEE.

| | |
|---|---|
| J. Newton Glover, Chairman, | Vicksburg. |
| H. C. Snavely, | Cleona. |
| A. J. Kahler, | Hughesville. |
| A. T. Holman, | Millerstown. |
| W. H. Stout, | Pinegrove. |
| Matthew Rodgers, | Mexico. |
| M. M. Naginey, | Milroy. |
| H. G. McGowan, | Geiger's Mills. |
| N. B. Critchfield, *Secretary*, | Harrisburg. |

## ADVISORY COMMITTEE.

| | |
|---|---|
| N. B. Critchfield, *Secretary*, | Harrisburg. |
| Matthew Rodgers, | Mexico. |
| H. C. Snavely, | Cleona. |
| M. M. Naginey, | Milroy. |

## CONSULTING SPECIALISTS.

| | | |
|---|---|---|
| Botanist, | Prof. W. A. Buckhout, | State College. |
| Pomologist, | Dr. J. H. Funk, | Boyertown. |
| Chemist, | Dr. William Frear, | State College. |
| Vet. Surgeon, | Dr. Leonard Pearson, | Philadelphia. |
| Sanitarian, | Dr. Geo. G. Groff, | Lewisburg. |
| Microscopists and Hygienists, | Prof. C. B. Cochran, | West Chester. |
| | Dr. Harvey B. Bashore, | West Fairview. |
| Entomologists, | Prof. H. A. Surface, | Harrisburg. |
| | Prof. Franklin Menges, | York. |
| Ornithologist, | Prof. H. A. Surface, | Harrisburg. |
| Meteorologists, | Prof. W. G. Owens, | Lewisburg. |
| | Silas R. Eshleman, | Harrisburg. |
| Mineralogist, | Baird Habberstadt, | Pottsville. |
| Apiarist, | H. C. Klinger, | Liverpool. |
| Geologists, | Dr. Isaac A. Harvey, | Lock Haven. |
| | W. H. Stout, | Pinegrove. |
| Forests and Forestry, | Robert Conklin, | Harrisburg. |

# STANDING COMMITTEES.

## LEGISLATION.

| | |
|---|---|
| Hon. A. J. Kahler, Chairman, | Hughesville. |
| Hon. Jason Sexton, | North Wales. |
| Hon. H. G. McGowan, | Geiger's Mills. |
| Matthew Rodgers, | Mexico. |
| S. S. Blyholder, | Neale. |

## CEREALS AND CEREAL CROPS.

| | |
|---|---|
| J. Newton Glover, Chairman, | Vicksburg. |

## ROADS AND ROAD LAWS.

| | |
|---|---|
| Samuel McCreary, Chairman, | Volant. |

## FRUIT AND FRUIT CULTURE.

| | |
|---|---|
| H. H. Hall, Chairman, | Ellisburg. |

## DAIRY AND DAIRY PRODUCTS.

| | |
|---|---|
| W. E. Perham, Chairman, | Niagara. |

## FERTILIZERS.

| | |
|---|---|
| Jason Sexton, Chairman, | North Wales. |

## WOOL AND TEXTILE FIBRES.

| | |
|---|---|
| W. C. Black, Chairman, | Mercer. |

## LIVE STOCK.

| | |
|---|---|
| I. A. Eschbach, Chairman, | Milton. |

## POULTRY.

| | |
|---|---|
| J. D. Nevius, Chairman, | Philadelphia. |

## FLORICULTURE.

| | |
|---|---|
| Edwin Lonsdale, Chairman, | Girard College, Phila. |

## FEEDING STUFFS.

| | |
|---|---|
| G. G. Hutchison, Chairman, | Warrior's Mark. |

# PROCEEDINGS OF THE THIRTY-FIRST ANNUAL MEETING OF THE STATE BOARD OF AGRICULTURE, HELD IN THE ROOM OF THE HOUSE APPROPRIATION COMMITTEE, THE NEW CAPITOL BUILDING, HARRISBURG, PA., JANUARY 22 AND 23, 1908.

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Harrisburg, Pa., Wednesday, January 22, 1908, 9 A. M.

Vice President J. A. Herr in the Chair.

The CHAIRMAN: The Thirty-first Annual Meeting of the Board will please come to order. First in order is roll call. Will the Secretary please call the roll.

The SECRETARY: I think I will call the representatives of the several counties by the counties. In some of the counties there have been changes, and if called by name there might not be any answers even though the counties are represented.

The roll of members was then called by the Secretary, and at this and subsequent roll-calls the following persons answered, a quorum being present at first roll-call:

Gen. James A. Beaver, R. I. Young, A. I. Weidner, S. S. Blyholder, A. L. McKibben, W. C. Lutz, H. G. McGowan, Erwin Platt, H. M. Gooderham, John A. Woodward, M. E. Conard, S. X. McClellan, E. M. Davis, J. A. Herr, A. P. Young, J. F. Seavy, R. M. Heyburn, John M. Witman, John P. Young, J. L. Patterson, Geo. G. Hutchison, Peter B. Cowan, Matthew Rodgers, Horace Seamans, Samuel McCreary, H. C. Snavely, P. S. Fenstermaker, A. J. Kahler, W. C. Black, M. M. Naginey, R. F. Schwarz, J. Sexton, I. A. Eschbach, A. T. Holman, Edwin Lonsdale, H. H. Hall, W. H. Stout, J. F. Boyer, E. R. Warburton, Frank A. Davies, J. Newton Glover, R. J. Weld, D. S. Taylor, Warren E. Perham, M. P. Shoemaker, D. A. Knuppenburg and G. F. Barnes.

Ex Officio Members present were Hon. Edwin S. Stuart, Governor, Dr. N. C. Schaeffer, Superintendent of Public Instruction, and Hon. N. B. Critchfield, Secretary of Agriculture.

The following Consulting Specialists were also in attendance: Dr. William Frear, Chemist; Dr. Leonard Pearson, Veterinarian; Prof. C. B. Cochran and Dr. Geo. G. Groff, Microscopists and Hygienists; Prof. Franklin Menges, Entomologist; Prof. H. A. Surface, Ornithologist and Entomologist; and W. H. Stout, Geologist.

The CHAIRMAN: The minutes of the last meeting will now be read.

The Secretary then read the minutes of the last meeting, which, upon motion of Mr. Schwarz, seconded by Mr. Hutchison, were approved as read.

The CHAIRMAN: Next comes the appointment of the Committee on Credentials. I will appoint the following gentlemen to act as this Committee: Messrs. Perham, of Wayne; Hall, of Potter; Lonsdale, of Philadelphia; Boyer, of Snyder, and Seamans of Lackawanna. Any of those present having credentials will please report them to this Committee.

The SECRETARY: The Chairman will please get the credentials that are in the hands of the Secretary.

The CHAIRMAN: While the Committee sees that the certificates and credentials of new members and delegates are in order we are ready to listen to reports of Standing Committees, and the first in order is the report of the Committee on Apiary, by J. W. Nelson. Is Mr. Nelson here?

The SECRETARY: Mr. Chairman, Mr. Nelson is not here, but his report is here.

The CHAIRMAN: What action shall be taken on this report?

A Member: I move that this report be received and printed with the proceedings of the Board.

This motion having been properly seconded, and the question put, it was agreed to.

The report is as follows:

## REPORT OF THE COMMITTEE ON APIARY.

By J. W. Nelson, *Chairman.*

The season of 1907 has been an unusual one, and probably no branch of industry is more vitally affected by climatic conditions than that of Bee Husbandry. Owing to a mild winter, there was very little actual winter loss, but a very warm week in March was followed by cold and wet weather, lasting almost continuously till the first week in June, causing very heavy losses almost all over the country. Thousands of colonies died and thousands more were so reduced as to be of no use the present season. Practically all of this loss could have been avoided by careful feeding, but too much other work and the hope that the weather might change sooner than it did, led many to wait until it was too late. In my own case fully one-half of my colonies did not produce a swarm or produce a pound of honey and have scarcely enough stores to winter them, while some that had honey to carry them through the unfavorable spring turned off two swarms and from twenty-five to fifty lbs. of surplus. The one that I reported as having Foul Brood last year turned off a swarm and forty-five lbs. surplus with no sign of disease. This with like reports coming from all over the country has led me to doubt the wisdom of Special Legislation on this line. A weak effort has been made at the last two sessions of the Legislature to get a Foul Brood law passed. In both cases the result was a failure. The last bill offered, while containing some good features, was open to the objection that it took the subject entirely out of the hands of the Department of Agriculture.

There are some very good reasons why this should not be the case. Apiculture is a part of agriculture and should be a part of its work, besides I am of the opinion that without a large expenditure of money the work would be a failure. I am of the opinion though that the same amount of money expended in educating the farmer in the cause and control of bee disease would bring better results. I think that we have the disease under control and that it is not only necessary to kill either the bees or queen or even to destroy hives or comb, but there ought to be some one in each corps of lecturers fully competent to give this instruction.

There are three essentials to success. First, to remove the old bees and queen to a new hive entirely without comb, when they have consumed all the honey they contained, or say the second day put them on comb foundation. Next take the hive containing the brood to a new location, keep almost closed till brood is all hatched. Destroy all queen cells and keep queenless at least twenty days, then give them a queen cell just capped, by the time this queen emerges from her cell all old honey will have been consumed and the bees will have the cells all cleaned out. Third—carefulness. If these simple instructions are carefully carried out, all will be well, but it must be remembered that no flying bees from the diseased hive be allowed to enter any other hive as they will carry the disease. To do this it must be done after the bees quit flying for the day, and it would be well to cover with a cloth the hives nearest the diseased one. It will also be necessary to close the entrance of the hive containing the diseased brood one day and then to watch closely that no robbers get in. If the young bees get short of stores they must be fed, and if the larvæ are 40 per cent. or more diseased, it will not pay to bother with them, in this case the combs and brood should all be burned. The unfavorable weather of April and May was about as disastrous to the fruit as to the bees, most of the Japan Plums and peach trees dying to the ground. There was a light run of honey in June, a fairly good basswood flow. Buckwheat was not worked on but a few days, but we had a good flow for two weeks on the goldenrod and astors, colonies that were strong making a good surplus. Reports vary. Some sections report a fairly good yield while others report failure. On the whole the crop is about 80 per cent. both in Pennsylvania and most of the United States. The Department of Agriculture is not doing as much as it should for the industry. There is too much money going out of the State for honey, too little of it consumed, while too many thousand dollars worth goes to waste ungathered. So that there is a large field open for development. While it is all right to encourage the farmer to produce more honey, it is a question whether he can make it a success, or whether we are not approaching in agriculture as in mechanics, an age of Specialized Industry.

The CHAIRMAN: The report of the Committee on Floriculture is next on the program, but the Chairman of that Committee, Prof. Lonsdale, is out with the Committee on Credentials. We will, therefore, take up the next subject, which is the report of the Committee on Dairy and Dairy Products. Is Mr. Weld present?

Mr. Weld being in attendance, the report of the Committee on Dairy and Dairy Products was read. This report is as follows:

## REPORT OF COMMITTEE ON DAIRY AND DAIRY PRODUCTS.

BY R. J. WELD, *Chairman.*

The year 1907 has been a remarkable one for high prices. Dairy products have not been the exception. The year entered with butter at 32 cents and the market did not fall below 22 at any time during the year, going back up to 30 cents at the close of the year. The demand for dairy products has been brisk throughout the year and the man who was in a position to supply found a ready market at good prices. The gross returns from the dairies have been larger during the past year than for several years previous but this is off-set by the high prices of feeding stuffs so that the net return has not been as much in excess of previous years as some might expect although several reports have come to me which indicate that the dairies are returning to their owners rather above the average. This is the encouraging feature of the business and to my mind shows that some of the dairy work which is being done throughout the state by interested men and the agricultural press is having its effect. The greatest need of the present day dairymen, as I see the situation, is a more thorough knowledge of his business. He needs to place every animal in his herd upon her own merits by carefully weighing her milk at each milking and testing it once a month and then eliminating those animals which do not give a profitable amount. The matter of improved blood in the sires of the herds is also an important one and too little attention is given to this important item in dairy work.

Another matter that is worthy of consideration at the present time owing to the very high price of all feeding stuffs is the net returns from the cows for the care and feed given them. It seems to me that the demand for good dairy stock this spring will be brisk, and it is interesting to note that those animals which show capacity find the most ready sale. This only further emphasizes the importance of more care in the breeding of our dairy stock. It seems to me that every member of this organization could do a lasting good for the people of his community if he could in some way incite them to a more careful consideration of their breeding stock.

The CHAIRMAN: You have heard the report of the Chairman of the Committee on Dairy and Dairy Products; what action will be taken on it? Will you discuss it?

A Member: I move it be received and placed on file for publication with the proceedings of the Board.

This motion was properly seconded, and the question having been put, it was agreed to.

The CHAIRMAN: If there is no disposition to discuss it, we will pass on to the next subject, the report of the Committee on Feeding Stuffs.

Mr. Hutchison, the Chairman of the Committee on Feeding Stuffs, thereupon read the following report:

## REPORT OF THE COMMITTEE ON FEEDING STUFFS.

BY G. G. HUTCHISON, *Chairman.*

One year ago your Board created a new Committee, naming it the Feeding Stuffs Committee, and appointed me as Chairman. I would say the term "feeding stuffs" covers a multitude of sins in the feeds that come into and are manufactured in Pennsylvania. Our forefathers manufactured their chops out of whole grains, such as corn, rye, oats and other grains grown on the farm. You, as boys, remember going to mill, as it was called in our day. You can remember the old horse that you rode, carrying you on top of a bag of grain. The only one the farmer had to watch at that time was the good miller. He was supposed to take out one-tenth for his share for grinding the feed, but how often we thought he had given us his share and kept the grist. As years come and go, men have to have drink and food taken from the cereals and left this a by-product. The brewer leaves the barley and corn, which are dried and sold as brewers' grains. The oat mills which manufacture our oat meal, leave the oat hulls. The manufacture of hominy and breakfast foods, leave the hulls and germ. The distillers leave distillers' grains. The glucose factories leave gluten meal, and so we find these goods coming into the markets of Pennsylvania under the names of different articles of commercial feeding stuffs compounded as it may suit the manufacturer.

On April 25th, 1901, Governor Stone approved a law that had been passed by the Legislature, known as the law regulating the sale of concentrated commercial feeding stuffs. This law was amended on April 24th, 1905. The Department of Agriculture enforced these laws. For several years the agents of the Secretary of Agriculture visited the dealers and secured samples of the different feeding stuffs that were on the markets, as the law directed, and gave copies of the law to the dealers, trying by this means to have the dealers and manufacturers comply with the law, but this did not do any good. The manufacturers kept on making poor low grade feeds and flooding our markets with the same. On December 4, 1905, your Secretary of Agriculture, Hon. N. B. Critchfield, gave orders to bring suits on each sample where the dealers had violated the law. This was done and the Department was successful in securing convictions in almost every case. In some counties prominent attorneys were employed and cases were fought with a good deal of opposition, but the courts and juries sustained the law and, with a few exceptions, verdicts in favor of the Department were given.

This work showed the manufacturers outside of Pennsylvania that the Department of Agriculture meant to enforce the law as they found it on the statute books. But you may ask, What were the violations? If you will secure Bulletin No. 145 of the Department of Agriculture in regard to concentrated feeds, it will give you the analysis and will show you the adulterations. I might say that the chemists found in wheat bran, rice hulls, corn cobs and other adulterants. In samples of chop were found coffee hulls and a number of other adulterants; but the great adulterant coming into our markets at that time, was oat hulls. They were coming in by the carload and almost every dairy county had large feed stores handling oat hulls. Not being satisfied to sell the oat hulls that came from the oat grain, there was another feed that they combined with it, known as oat dust, also the sweepings of the large mills. This feed was sold in competition to oat chop, and you can readily see what amount of deception there would be in this feed.

In the trial of these cases, I frequently ask the question, What is the feed value of a ton of oat hulls and oat dust? The answer Prof. Fuller, our Chemist, gave, was $5.00 per ton, but at this value to-day and what it shows in the market, it would be $3.55 per ton. This stock was retailing at $18 to $20 per ton according to the price of oats chop. They would always sell it a few dollars less, and place the analysis high in protein and fat. On this is what is based our prosecution, as false analysis of protein and fat. Very few of the oat hulls and oat feed people made a defense, as they had nothing to stand on and they paid their fines without a contest.

Another way of adulteration, men who are millers and feed dealers, would buy a carload of these oat hulls and oat dust and mix it with a small percentage of ground corn or glutten meal and sell it for corn and oats chop.

We have broken up this custom, and in our work do not find our millers or feed dealers following out this practice. I would say that the millers of Pennsylvania are making their chop of whole grain except in some cases where they use wheat midlings or wheat bran. This was the condition of affairs, as we found them in Pennsylvania when the Legislature met last year. A number of feed bills were started in the Legislature, but after they had been in for some time a conference was called by the Agricultural Committee of the House, of the millers, feed dealers, farmers and all that were interested in this legislation, and after giving the matter a great deal of study, the bill that is now on the statute books, which became a law on May 28th, 1907, is the one that we are working under. All parties who were interested in the framing of this law were working for the best interests of the farmers and feed dealers.

The bill made a number of changes. I might mention in regard to sampling, the law states that the sample must be taken from four separate packages and thoroughly mixed and one sample left with the dealer and the others sent to the Secretary of Agriculture.

It also provides that there is a variation in the analysis, so as to meet the climatic conditions that may exist in the growing of grains. It also provides that any citizen of the Commonwealth can send a sample to have analyzed by sending a fee of $1.00. I would state, under this provision, that 293 samples have been received and analyzed since August 1, 1907, when the new law went into effect. The new law provides that the crude fiber must be given on the analysis and the composition or ingredients from which the feed is compounded. This is a very important provision. The farmer may not understand the full meaning of protein or fat, as he sees it on the package, but when he reads that it contains weed seeds, rice hulls, peanut hulls and substances that he knows do not contain any feed value, he will soon say to his dealer, I do not wish to buy food of that kind, and by this means we will be able to correct an imposition that is being imposed on the Pennsylvania farmers and stock feeders.

Another section of the law regulates the manufacture and sale of patented or trade marked poultry foods. This involves such preparations as stock foods, poultry foods, and names that indicate that they are a food, or feed or poultry food for domestic animals. A number of the farmers are claiming that their goods are only for medicinal purposes, and are removing from their labels anything that may designate them, as a feed or food. There is a great fraud in the composition of these preparations. The base of a number of them is wheat middlings, and the analysis shows that the other ingredients contained therein can be bought in any drug store at a small cost. Almost any of these preparations can be manufactured at a cost not exceeding thirty dollars per ton, and they sell from 90 to 400 dollars per ton, as we find them on the markets. A number of our poultrymen claim that they derive no benefit at all from feeding these foods, but almost every country grocery store carries a large stock of them, and if the chemist and poultrymen are correct, I am afraid there are thousands of dollars paid out each year in Pennsylvania for these preparations, that if they were invested in oyster shells, grit, corn, oats, bran and wheat middlings, would help the American hen to produce a larger number of eggs and bring more dollars and cents to those who keep poultry.

In the enforcement of the law, the imprisonment clause was stricken out, but the amount of fine for the second offence was increased. Also in the matter of fines and analysis fees, these are all paid to the State Treasurer. None of these go to the Department for the enforcement of the law. This, in my opinion was one of the best provisions that could have been placed in the law, as it took out of the law the sting that the Department and its representatives were receiving money from the attorney and others who were opposing the enforcement of the law. The Legislature, in its wisdom, provided an appropriation to cover the expenses for the enforcement of the law. The new law has increased the work. The Laboratory now has one Chief Chemist and three Assistant Chemists, with one Laboratory Assistant. In the office we have a Stenographer, in the field work, there are three agents. We have plenty of work for all to do. In fact the laboratory is now crowded with work.

I might refer to what we are finding in the markets at the present time. We find that the man who compounds molasses grains has found a mode of covering up a large amount of adulterations. He takes as a base, distillers' grains or brewers' grains, and with this he mixes rice hulls, peanut hulls, barley hulls, weed seeds and screenings. The screenings here referred to are not wheat grains, but they are weed seeds and other impurities that are screened out of the wheat, oats and other grains that are purified for other purposes. We are having quite a warfare against these dealers at the present time. We find on the market a meal known as peanut hull. This is being sold to some extent, and is found in some of the by-product feeds. We also find a number of gluten feed manufacturers that are artificially coloring their gluten feed. The question of placing weed seeds in as an adulterant, is a very serious one to the farmers of Pennsylvania. These weed seeds are not digestible and they pass through the animal whole and are distributed over our farms, and in a short time there is a new crop of weeds springing up over the fertile farms of Pennsylvania, and our farmers are at a loss to know where they come from. In this line, I would make a suggestion to the Board, that they favor the law regulating the sale of grass seeds in our State and have some standard of purity.

The new law went into effect on August 1st, 1907. Prior to that time, there were sent out 15,000 copies of the new law. These were sent to as many of the feed dealers and millers in Pennsylvania as it was possible to secure their addresses. Copies were also sent to all of the manufacturers of feed products outside of the State. Care was taken in sending these copies out, as each one was sent in a sealed envelope. Copies were sent to the weekly and a number of the daily papers throughout Pennsylvania. This Department did this that the dealers might become versed in the new law, and not be ignorant of its provisions. The laboratory in which this work is being done is situated on the fifth floor of the north wing of the new Capitol building, Harrisburg. If any of you wish to visit this place and see the work there, Prof. Fuller, who is the Chief Chemist in charge of the work, or any of his assistants would be glad to show you what we are doing. I have here before you some samples of the different adulterants, as the Chemist is finding them. I would be pleased to have you examine them.

This Division is being conducted for your benefit. I would ask you to make use of the same. If you would for a few minutes just turn your thoughts to the money value that this work is accomplishing for the farmer, it would astonish you. Take for instance, a car load of twenty tons of feed. This car costs the farmer $22.00 a ton. That would be $444 he pays for it on sight draft. Now suppose this car is made up of one-fifth adulterant, you have the sum of $88; but a large percentage of this feed is adulterated from one-fourth which would run it over $100. Then if you take into account this low grade feed which is not digestible, you are still adding to the loss side of this claim. But I do not wish to make this my first report too lengthy. This is a subject to which we are giving our best efforts to try and save the farmers of this State from buying this worthless feed.

We are often asked the question, Has not one of the Courts of Philadelphia declared the commercial feeding stuff law unconstitutional? I would state for the information of the Board that they have not declared this law that we are working under now unconstitutional, but Judge Audenried declared the amendment to the law of April 25th, 1901 unconstitutional as far as it regards bran and middlings. He declared the proviso which is as follows: "Providing that nothing in this act shall be construed with prohibitng persons engaged within the State of Pennsylvania in the business of manufacturing flours, from selling at the place where made their own manufacture of bran and middlings." The Department of Agriculture did not take this matter to a higher court, as the Legislature was considering the present law and that portion of the new law was changed and was worded as to not raise that question. In the trial of the cases under the new law up to this time, the attorneys for the defense in the cases that we have brought have not questioned the constitutionality of the law. We cannot tell what they will do, but if I am rightly informed, a section of the law can be declared unconstitutional and not effect the general law.

MR. BAYARD: Have you made any germination test of these seeds?

MR. HUTCHISON: That part of it is referred to the chemist, and will be given you in his report.

MR. BAYARD: I have seen some germination tests made; some of the seeds won't grow, but others will, and the manufacturers want to find out how to treat these seeds so as not to grow. I find that in some of the molasses feeds they will grow, while in others they won't. I have seen tests sent from Chicago, and the manufacturers are anxious to find out how to treat them so that they won't grow.

MR. HUTCHISON: I don't know at all.

MR. BAYARD: You will be surprised to find how some of these seeds will grow, and what they will produce; why, I have seen cactus grow from some of these seeds.

The SECRETARY: Unfortunately, the faces of the members are away from the light. I want to give everybody credit for what they have said; I don't want to say simply "a member" said so and so, and I will be glad to have the Chairman name you when you rise, or, if he doesn't recognize you, I wish you would give your names, so that we can give you the proper credit.

MR. KAHLER: We bought some of these molasses feeds, and afterwards we got a notice saying that some of these seeds would grow all over the farm, and I said to my son, "now, don't you use this stuff until we have tested it and find out whether this is so, or not," and I am glad to say that the result of our test was that we need not have any fear of its germinating.

MR. BLYHOLDER: What good did it do?

MR. KAHLER: The cattle seemed to grow fat on it, and thrived all right. Whether it was the molasses or not, I don't know.

MR. HUTCHISON: I didn't say that the feed was all weed seeds. That is not what I meant to say. The foundation is brewers' grains, but that makes the best adulterant, and it lowers the price. Now, as to the germination tests, Prof. Fuller is coming here, and he will tell you what he has done in this direction. And I understand that some of the Experiment Stations are conducting experiments in this line. Now, the seeds may not grow this year; if you have any other good crops, it is likely they will not, but they may spring up next year, and you will wonder where they came from.

MR. HERR: Don't all these seeds grow?

MR. HUTCHISON: No. I have heard where they did grow, and they are selling it for flax-seed meal and corn screenings. They tried to mix us on this question, and called it "wheat screenings," but there is not a grain of wheat in it so far as the screenings is concerned, according to the examination. When you look at it through a magnifying glass you find all manner of seeds there, almost, that is grown on the farm. Now, look at these rice hulls through a magnifying glass, you will see a saw-like tooth on the sides. The Veternarian claims that this will injure the stomachs of the animals that eat it. Now, this sample is ground peanut hulls. Look at them at your leisure. This bottle is a sample of oat hulls, and this is a sample of the dust they are putting in. I got this last week from one of the men trying a case at Beaver Falls. In the Good Book we read a story about the tares that grew up with the wheat, and of its results. I think that by using these feeding stuffs adulterated with weed seeds, we will not have much trouble in proving its truth to-day.

MR. FENSTERMAKER: Reference has been made to molasses seeds here. From information I received last night from a dairyman in our county, the farmer is very foolish to buy any of those on the market, as he can make them much better and cheaper at home. This man tells me he pays $6.00 a barrel for his molasses, and then mixes the feed himself. It was Mr. Eckert, the President of our Association, who told me this last evening.

The SECRETARY: That is what I am paying for it, and I mix it myself.

MR. SEXTON: This is an interesting question to us who have dairy cows to feed, and I want to ask Mr. Hutchison whether in the mixtures of molasses feeds he has ever found ground corn cobs? Prof. Menges, who is, as you all know, one of our brightest men, stated before a meeting down in our county last week, that this is often done. I should like to know whether Mr. Hutchison has ever found it so in his work?

MR. HUTCHISON: I beg to refer that question to Prof. Fuller who is to be here this morning. He can tell you. A few years ago we found corn cobs ground up and mixed with bran, but we fought them, and I don't know whether it is now found or not. You could not tell by simply taking the mixture in your hands. It would look like ground bran. However, Prof. Fuller may be here any minute, and he can tell you. Have you had any information on this, Mr. Secretary?

The SECRETARY: It has not been reported to me.

MR. HUTCHISON: If you want to find a large amount of this seed, you want to get into a dairy town. Lancaster and York have been quite a field for us. And then these manufacturers, when they find that we have taken away their trade with the dealers, they go to the farmers, and find some farmer, generally a man of influence and standing in the community, and get him to act as their agent in that particular territory. He sets to work, honestly enough, in most cases, and they think they are getting the stuff cheap, when they are really doing just the opposite. They are paying the highest possible price. I know of one manufacturer, in particular, who has done this. I don't want to mention any names, for fear you might think I have a prejudice against them. When he cannot sell to the feed dealers any more, he goes and gets an honest farmer, the best man he can get, and gets him to handle a carload or two of this stuff, and makes the man believe he is doing his friends a kindness when he sells them this feed, while the result is that he is selling them the poorest stuff on the market. I don't know that any of you men have done this, but he has found men that are just as intelligent and as honest to do this work.

MR. STOUT: Can you prosecute a man under the laws of the State who is out of the State?

MR. HUTCHISON: We can't reach him out of the State, but we can bring suit against his agent, and that generally brings down the man.

The SECRETARY: Except one man.

MR. HUTCHISON: Yes, except one man. He never comes. We always strike as high as we can, and that generally in the end, reaches the shipper. I don't think the Secretary will object if I say some nice things about him. We are all here together, and you all know him, and you know that his heart goes out to the farmer. He does all that he can to protect his interests. Sometimes we can't reach the man out of the State, but we can try to take his agent and reach him in that way.

MR. SEXTON: Do you find any particular virtue in cottonseed meal? You know we have to pay tremendous prices for it.

MR. HUTCHISON: I would like to have the chemist here. What comes into my hands are the prosecutions. We have had cotton seed goods come to us that were sold as containing 41 per cent. of protein, where the analysis only showed 32 per cent. Of course, we started prosecuting them.

MR. SEXTON: We were among the first feeders of cotton seed in this country. Those of us who marched through the South during the war of the Rebellion saw whole piles of cotton seed, which the people there didn't know what to do with. They never did know, except to use it as a fertilizer. Then after the war, there was an additional use found for it, but I was able to buy it at $13.50 a ton delivered at my station, the finest kind of cotton seed. Where are we now? We pay three times the price for it, and we are not sure that it is pure at that.

MR. McCLELLAN: It looks to me as if there were two sides to this prepared feed question. There is possibly a demand for cheap feed, but if they demand this feed at a price at which pure feed cannot be sold, they have to put in something to make the price cheap. If I go into the market to buy a horse, and demand a $250 horse for $200, I will lose about $75 on that deal, because I will probably get a $125 horse for $200. The same thing holds good on the prepared feed question.

MR. SHARPLESS: I am not a member of the Board, but I live in a dairy district, in South Chester County, and we have these things to contend with. A few years ago we were just flooded with these things, but to-day, since the feeding stuffs law went into effect, you can hardly find any of them. There was one in particular, that had a large sale, that was guranteed to contain 16 per cent. protein, and about 4 per cent. fat, but when this new law went into effect, and it was analyzed, it was found to contain about 11½ per cent. protein, and little or no fat. And since the analysis has to be printed on the bags, it has really about driven this particular brand out of the market. I don't know whether there is any of it in the State now or not. But I want to know whether you know anything of the feed known as the Hand and Dairy Feed?

MR. HUTCHISON: Yes, sir; we run across it all over the State, and it seems to give good satisfaction for the price. We had commenced prosecutions against the Ajax people, but the man against whom most of the prosecutions were brought, died, and passed over to the other shore. You can't prosecute a man after he has gone over there. The business is now being conducted by his son, and we have practically driven them out of the market.

Now, I don't want you to think, Brother McClellan, that we condemn all these feed stuffs, but if you find an article that is open to question, if you will write to the Secretary or to the State Chemist, they will give you a courteous reply, and may save you hundreds of dollars. We have one of the finest laboratories in the State, and it will only cost you a two cent stamp to get the information you need.

I should like to hear from the Secretary on the question of molasses feeds.

The SECRETARY: I want to tell you first of all that it will cost you more than a two cent stamp, if it is a new feed that must be analyzed; in that case the law provides that it will be necessary to send a sample, accompanied by a dollar. The dollar will not cover the cost of analysis, but it is merely a protection against the office being flooded by a lot of samples sent out of curiosity for analysis, which would not be of any particular value.

Now, as to the feed: early in the year my farmer reported to me that we would not have nearly feed enough to carry us through. I thought we would have to get some commercial feed, but it was possible that we might have some barley to sell.

In order to get a good molasses feed without running the risk of being adulterated, I wrote to a manufacturer at Johnstown, which is about sixteen miles from where I live, and had him send me a ton of brewers' grains. I knew that was all right, because I have frequently been at his place, and knew what he was handling; then I sent to a Philadelphia firm and got a barrel of molasses, for which I paid $5.00. I instructed my farmer to take two parts by measurement of the dried brewers' grain and one part of buckwheat middlings. We have found it quite profitable in our country to raise buckwheat, and my plan has been to take it to the mill, sell the flour and use the meal for home consumption. To the two parts of dried brewers' grain and one part of buckwheat middlings, I had him take one half part, by measurement, of the molasses, and mix it in a mixing trough, allowing two quarts of grain, one part of buckwheat middlings and one pint of molasses for each animal. Of course measures that would take enough to feed all the animals were used. Then the molasses would be stirred in water, and brewers' grain and the buckwheat middlings was then put in, and well mixed. The results have been beyond my most sanguine expectations. We have not only fed our milch cows this way, but we have fed the horses as well, and the results have been remarkably good. I don't know why we should take any risks in buying these molasses feeds, when it is so easy to prepare them ourselves. The ordinary feed mixing trough is all that we need. Since it is so simple to prepare these feeds at home, the farmer can experiment along these lines, and find out exactly what is best for his animals. If I had been mixing it myself, I should probably have done so by weight, but since I was not on the ground, I instructed the farmer to mix by measure. He reported to me that at first it seemed to produce a laxative effect in the horses, while the cows did not seem to mind it, but after the first week or ten days there was no visible effect on the horses.

MR. STOUT: There is a subject mentioned here that is new to me; it is this buckwheat middlings. When we take buckwheat to the mill, they take out the flour and leave only the hulls. I want to know whether this middlings is the bran after the flour has been taken out.

The SECRETARY: I have always regarded middlings as that which comes between the hull and the flour. The mills out in my section of the State have some method by which they get off the hull. There is but little hull in my middlings. I notice that in some sections of the State the flour is mixed, and the hull alone is left. How is it in your section, Mr. White?

MR. WHITE: The middlings is just what the Secretary describes it to be, but the new attrition mills grind up the hulls and mix it with the flour. You can't mix the hull unless it is very fine, but the new attrition mill will grind it as fine as pepper; then it can be turned back into the flour and sold as a feed. Some mills have a method of putting the hulls directly under the boilers and using them as fuel. We tried it once, and found it somewhat unsatisfactory.

MR. BAYARD: I would like to ask Mr. White how many pounds of flour he will get out of a bushel of grain?

MR. WHITE: Out of fifty pounds of grain we can secure about thirty to thirty-two pounds of legitimate flour, from eight to ten pounds of middlings, and the balance hulls. This year the weight of the hull was more than usual in our section. The buckwheat crop was not a very good one, and the hull was so very heavy that we found we cast off from twelve to fourteen pounds of hull. That is what created the temptation to use the hull. Instead of getting from thirty to thirty-two pounds of flour this year, it has been very difficult to get over twenty-six pounds of good flour. It is from four to six pounds less.

The SECRETARY: That is what we got in our section—from four to six pounds less.

SECRETARY MARTIN: I would like to know how it is that in our section of the State our mills report us no middlings. The finer parts of the wheat is ground up into flour, leaving only the hull. How is that done?

MR. WHITE: That is done by a few mills in the State. The Long system mills have done it, grinding it so that it is fine enough to go through the buckwheat flour cloth, but you get a darker flour this way, something like the whole wheat flour from the grain. A few mills are doing it.

The SECRETARY: And yet in the South I have found that that flour will sell better than the finer white kind.

MR. WHITE: I never was so sorry or provoked in all my thirty years' experience than I was to have a carload of flour rejected in the South because it was white. By this process of grinding up everything but the hull, they get from forty to forty-two pounds of flour to the bushel, while by the process of eliminating the middlings they get from thirty to thirty-two—a difference of about twenty-five per cent.

MR. MARTIN: I find that the flour is sold up the State at four cents a pound.

MR. ESCHBACH: I come originally from probably the largest buckwheat growing area in the United States—up in Bradford County, and up there the flour was ground as it has been described here, so that all that could be weeded out was a small amount of shorts, but since I came down to Northumberland County, there is a large buckwheat mill there which makes three kinds of flour—they make flour, middlings and bran. I never saw it done before, and I am free to say that it is not as good a flour as we got in our own county, although it is much whiter. It is more like wheat flour, although I know it is not adulterated. Now, this wheat flour is what you probably get hold of. It has not a trace of the hull; the bran, or what we call the "shorts," has quite a trace of the hull—at least in my county.

MR. HERR: There is a temptation to use wheat flour with it, and this process that Mr. White describes makes the product very much resemble wheat flour—so much so that I have found it hard to convince the people that this is not so.

The CHAIRMAN: Any further discussion? If not, what shall be done with this paper of Mr. Hutchison?

A Member: I move it be received and placed on file with the rest of the proceedings.

This motion being properly seconded, and the question put, it was so ordered.

The CHAIRMAN: I see that the Committee on Credentials is in and ready to report. We will now receive this report:

## REPORT OF THE COMMITTEE ON CREDENTIALS.

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We, your Committee on Credentials, find the following credentials correct and in due form, and we recommend their adoption by the State Board of Agriculture:

John M. Witman, Elk County.
R. J. Weld, Warren County.
E. B. Dorsett, Tioga County.
A. L. McKibben, Beaver County.
John P. Young, Franklin County.
W. C. Black, Mercer County.
J. A. Herr. Clinton County.
Jason Sexton, Montgomery County.
M. P. Shoemaker, Westmoreland County.
D. S. Taylor, Washington County.
I. A. Eschbach, Northumberland County.
R. F. Schwarz, Monroe County.
J. Newton Glover, Union County.
George F. Barnes, York County.
J. F. Seavy, Crawford County.
S. S. Blyholder, Armstrong County.
R. M. Heyburn, Delaware County.
Erwin Platt, (to fill the unexpired term of E. E. Chubbuck) Bradford County.

W. E. PERHAM,
H. H. HALL,
HORACE SEAMANS,
EDWIN LONSDALE,
JOHN F. BOYER,
Committee.

The committee on Credentials also recommends that the following gentlemen be seated as advisory members of the Board, with privileges of the floor:

J. F. Brubaker,
J. P. Brendle,
S. P. Heilman, M. D.,
J. M. Groh,
Edward Shuey,
Peter R. Boltz,
Fred R. Fertig,
all of whom were elected delegates by the Lebanon County Agricultural and Horticultural Association. Also:

U. S. Peters, Lehigh County,
Jacob Super, Perry Co., Agricultural Society.

W. E. PERHAM,
H. H. HALL,
HORACE SEAMANS,
EDWIN LONSDALE,
JOHN F. BOYER,
Committee.

The CHAIRMAN: Gentlemen, you have heard the report of the Committee on Credentials. What shall be done with it?

MR. HUTCHISON: I move that the report be adopted, and these gentlemen be given the privilege of the floor.

MR. BLYHOLDER: There is one question that has been raised among a number of the members, and that is What time the terms of a number of the members expire. Now, many are present whose terms expire in 1908. Do they expire at the end of this meeting, or at the beginning? Some of them come here, Mr. Chairman, not knowing whether they are members or not.

The CHAIRMAN: The law says the fourth Wednesday in January, and my impression is that it is as soon as the Committee seats their successors. What is your interpretation, Mr. Secretary?

The SECRETARY: My impression is that it is not until the new members are elected. We are now completing the work of 1907, and in all political parties in which I have had any experience, it is considered that the representatives who are elected to serve for the next year, shall attend and take part in the preliminary exercises of the meeting or organization, and we therefore consider there must be present two sets of delegates. Those delegates who took part in the meeting of 1907 would necessarily have to be present, and therefore my understanding is that they are members until the re-organization has begun, and the officers elected for 1908 have taken their places, and they are entitled to participate in the business of the meeting until that takes place.

MR. BLYHOLDER: That makes the matter clear.

The CHAIRMAN: Is the motion regarding the adoption of this report seconded?

A Member: I second the motion.

The question was put, and the motion carried.

The CHAIRMAN: It is so ordered, and these members are elected.

MR. SCHWARZ: I beg to disagree with you. They have been elected by their societies; we simply receive them.

The CHAIRMAN: I beg to differ with you; this Board has the power to act on these new members. They are sent here by their Societies, and we are to receive them and elect them members. Isn't that so, Mr. Secretary?

The SECRETARY: I have always followed this system. After they were reported by the Committee, the names were directed to be entered upon the roll of membership. I am not sure, but I have always had the view that Mr. Schwarz expressed.

COL. WOODWARD: My impression is that the election is made by the County Association, and they are received and rejected, as we see fit here, but they are elected at home.

MR. SEXTON: A point arises in my mind: The old man has been serving a length of time, and a new man is elected to take his place; his sympathies are all right, but you can hardly expect the old man to come and help finish up the business to the time the new man takes his place. He gets no expenses from the State. There are two men representing the one county, and but one gets his expenses.

The CHAIRMAN: There is another question arising in my mind: the old man was Chairman of a Committee, and has a report to make. I should suppose, at least, if he comes here to make that report to the Board, that he is entitled to his expenses. I would ask the Secretary for a ruling on that.

The SECRETARY: If any member whose term expires in 1908 comes here to make his report, it will be published in the proceedings of 1908, and he will get his expenses, but I would suggest to the Executive Committee to appoint hold-over members, so that we do not have double expense. If the Executive Committee in making up the various committees, will bear in mind only to appoint men whose terms do not expire next year, we will not have any trouble.

The CHAIRMAN: Shall we proceed with the reports, or take up the election of officers?

The SECRETARY: As it is not late, I would suggest that we go on with the reports, and take up the election of officers later.

The CHAIRMAN: Acting on the suggestion of the Secretary, we will take up the report of the next Committee. Since Prof. Lonsdale is now in the room, we will listen to the report of the Committee on Floriculture.

The Report of the Committee on Floriculture is as follows:

## REPORT OF THE COMMITTEE ON FLORICULTURE.

BY EDWIN LONSDALE, *Chairman.*

Your Committee beg leave to report that the demand for flowering and decorative plants and cut flowers is on the increase. For the season covering the latter part of the year 1906 and the first half of the year 1907, it was the very best in the history of commercial floriculture, both for the volume of business done, and the remunerative price obtained. This statement applies all along the different lines—with those who issue catalogues and fill orders through that medium, and from which small orders are delivered through the United States mails and the larger ones through the different express companies. It is amazing, the number of plants that are carried to the furthermost ends of this and other countries through the mails, and there would be far more plants carried by this method if heavier packages than is now lawful were allowed by Act of Congress to be transmitted in that way.

The city florists never did a more profitable business than was done during the period referred to, and the growers of cut flowers who make a specialty of that industry never added so much to the area for the growing of flowers in any one year than was done last summer, and the superstructure on which the glass is laid was never so nearly solid as at the present time; the very best materials obtainable are used, and as much iron and steel as it is practicable to be put into such buildings are made use of. Cement, now-a-days, is in great favor both for the walls on the outside and the tables or retaining walls on the inside, all of which are healthy signs of the confidence of those who are directly interested in the still greater developments that are hoped for and expected in the future for floriculture. The backward spring of 1907 interfered somewhat with the demand for plants used for outdoor decorations. This applies to what are known as tender or bedding plants such as Geraniums, botanically known as Zonale Pelargoniums, Verbenas, Coleus, Crotons, Cannas and similar plants that need indoor protection in the winter time; but though the season was later than usual, there was little or no surplus stock left over. The demand for the hardy herbaceous plants continues to increase; these live out all winter, and in favorable locations increase in size and general effectiveness yearly. This class includes Peonies, Phlox, Columbines, Irises, and so forth.

All classes of roses are constantly increasing in demand. The Rambler varieties are increasing in number, of which the Crimson Rambler was the first to attract universal attention. Westgrove, Chester County, this State, is noted for the number and quality of rose plants sent out from there, and these go to all parts of the world. There are over one thousand varieties grown there, and it is further claimed that over one million plants of the rose are grown and sold annually from this great centre of the rose growing industry. The raising of new varieties of the rose from seed still goes merrily on. At the last meeting of the Florists' Club of Philadelphia, held two weeks ago, there were some very promising new varieties on exhibition. Among them was "Aurora," a Pennsylvania seedling, raised at Leighton, and is the result of a cross between two French roses, namely, Souviner du President Carnot and Bon Silene. Unfortunately, there already is a variety called Aurora, so in order to avoid confusion, the matter should be referred to the nomenclature committee of the Society of American Florists, with the object in view of changing the name. I would suggest the name "Bon-Carnot" be substituted. This would solve the problem and be a combination of the parents of the rose. The claim is made for those who have watched the development of this new rose that it is an improvement on a variety that is at the present time quite a favorite, namely, "Madame Abel Chatenay." Aurora, as we will still call it until its name is changed, is well bred. One of its parents—the Bon Silene—was a great favorite from twenty to thirty years ago, and is still grown to some extent and used when "society buds" make their debut, and it is also used for sentimental reasons among those who were the reigning belles in society a quarter of a century ago. Its other parent—President Carnot—is a beautiful, delicate flesh pink in color, and the shape of the buds are all that could be wished. The Aurora is being tested by our expert in growing roses for cut flowers at Hillside, Montgomery County, and great hopes as to its future value are confidently indulged in.

"Wyndmoor" is another Pennsylvania seedling, as it is a native of Montgomery County, and was raised from seed in a rose-growing locality by the name which the new rose is known by, namely Wyndmoor. This rose growing settlement is about twelve miles from the City Hall, Philadelphia, and one half mile over the dividing line between Montgomery and Philadelphia Counties. There are now seven separate establishments located here, where in the year 1880, one only was started in a very modest and unpretentious way. It takes about five thousand tons of coal every winter to heat the numerous greenhouses here. The new rose now under consideration is a seedling between the well known and celebrated "American Beauty" and "Safrano," another old-time favorite, which flourished at the same time with the Bon Silene, above referred to. Wyndmoor is also pink in color, resembling in that respect the Hybrid Remontant, "Mrs. John Laing," though the flower of the new rose is not quite so large as the older variety, but it has the advantage of being a perpetual bloomer. It is very well thought of by those who admire and use flowers in large quantities. At one of the swell balls held a week or two ago in Philadelphia, buds and open blossoms of this variety were used to the number of seventeen hundred, and gave entire satisfaction. So far this new variety has only been used for winter flowering.

Still another seedling rose raised in Pennsylvania that promises to make good, and which first saw and flourished in the bright sunlight in the good city of Philadelphia has been honored by the name of the Superintendent of the United States Botanic Gardens at Washington, D. C., namely William R. Smith. This is the result of a cross between Maman Cochet and Madame Hosbe. The latter, which I believe was the pollen parent, was grown quite largely for the production of cut blooms in winter, and is grown to some extent at the present time, as it is a free bloomer and possesses the ideal shape in the bud form, and by liberal treatment the flowers may be grown to quite a large size, but its coloring was not considered sufficiently decided to become popular as a commercial cut flower; it is a creamy white; had it been a bright yellow similar to the Marechal Neil or Pere des Jardins, it would be grown quite extensively to-day. While the seed or pistilate parent, Maman Cochet, is recognized for growing outdoors as the Queen of pink garden roses, and where the tea scented roses are hardy, this variety is found to be the hardiest of the hardy. The progeny of this good pair of roses, the William R. Smith, was discarded by its raiser for winter blooming as not being bright enough in coloring during the dull winter months, but a firm of florists in the State of Indiana claim to be very much encouraged with some experiments they are making with it and are hopeful that they will succeed in developing it into a valuable winter bloomer. It has already proven its worth as a garden rose. Should it prove to be valuable for winter forcing, it will be another lesson taught, which is: not to be too hasty in condemnation, for it is a well-known fact that at the present time the very popular Irish rose, Killarney, when it first came out was by more than one firm of rose growers in the vicinity of Philadelphia, put aside as being too flimsy in its petalage. It is now very largely grown, being a very beautiful shade of delicate pink in color, and the buds are exquisitely graceful in form. This brings us to another new Irish rose, Mrs. Jardine. It was raised in Ireland, but its good qualities are being developed by a rose growing expert at Sharon Hill, Delaware County. It is being very highly spoken of as a promising variety. It is pink in color, but quite distinct from all others with pink flowers, being of a very delicate tone of color, and when the flower is about half open it is very beautiful.

Two other new roses were on exhibition at the Florists Club meeting above referred to, one of which came from Chicago, and the other from Richmond, Indiana. That coming from Chicago is known as the Mrs. Potter Palmer, and is what is known as a "bud variation," which means that it produces flowers different in color from the plant from which the cuttings or slips were taken; for instance, sometimes a branch on a given rose bush or some other plant may produce flowers differing in color from the other part of the plant; said branch is cut away and slips made therefrom. The young plants resulting from the cuttings are carefully watched to see if they produce the same color as the branch did from which the cuttings were made, and the chances are in their favor that they will, but sometimes they will take upon themselves to revert to the same color of flower that the original plant produced. Then, of course, our efforts have been in vain and have gone for naught. This particular variety, Mrs. Potter Palmer, produces flowers of a darker colored shade of pink than does the plant Madame Abel Chatenay, from which the newer form sprang. Whether it will prove valuable remains to be seen after further trial. The variety which came from Richmond, Indiana, is claimed by the originator to be a rival of the ever popular American Beauty, and a further claim is made that it is very much easier to manage than is the old standby, American Beauty, being what is known as an "easy-doer" but whether it is so or not on all soils and in all situations can only be proven by experimenting.

While it is quite correct to go on experimenting, with the hope and desire of producing improved varieties, all wise growers try all new varieties, but still hold on to that which is good, and that accounts for the fact that there are more American Beauties being grown for cut flowers in America to-day than there ever were before.

I have dwelt somewhat at length on the new rose question, because it is novelties in the way of new forms, new or brighter colors, or larger flowers which act as an incentive to higher ideals among the patrons of Floriculture and those who are interested in the same. It is the hope of producing something superior to what is already in existence that springs eternal in the flower growers breast.

Farms are being bought on which to erect greenhouses for the purpose of growing therein the already tried and true varieties of the rose. About a year ago, fifty acres were bought in Montgomery County by a firm of rose growers, and which is located quite close to the Reading Station at North Wales, and is in accordance with advice given in Bulletin No. 97, published in 1902 by the Department of Agriculture. This rose house is said to be the largest greenhouse in the world. It is over 150 feet wide, and will average between 400 and 500 feet long. For some reason only known to the owners, one side of this mammoth greenhouse is longer than the other, giving the end towards the Northeast the diagonal form, but for what reason is only known to the proprietors. This rose house is devoted exclusively to the growing of one variety, and that is the American Beauty, and in it there are 45,000 plants, and the purpose for which they are grown is for cut flowers. Montgomery County, I believe, produces more of the rose, American Beauty, for cut flowers than any other county in Pennsylvania. At the last census, taken in 1900, there was nearly $9,000,000 invested in the business of Floriculture. Only one state in the United States exceeds that amount, and that is the State of New York.

The past summer for carnations was not the best in some districts for producing large plants, many dying outright, consequently the supply of cut carnations flowers last autumn was not so good as in some former years, and prices ruled firm in consequence. Some growers of carnations when preparing them for blooming in winter, prefer to grow their plants in pots, from the time the cuttings are rooted and taken from their propagating beds, until planted inside the greenhouses especially prepared for the plants to bloom in during winter season, whereas others grow them outdoors all summer, and treat them similar to any other growing crop, as vegetables, by hoeing to destroy weeds and to keep the soil loose and in proper condition to conserve moisture and allow them to remain until just before frost may be expected, when they are transplanted to their winter quarters. And again other growers give them what might be termed the intermediate method, which means that the young carnations are planted in the field or garden just as soon as severe frost is over, and allow them to remain there until the first week in July—some florists and gardeners prefer the month of August to transplant them in to their winter quarters; there are really no hard and fast lines that are strictly adhered to in respect to the time when plants are transferred from the garden to the greenhouses, but it is quite noticeable that each year we find new converts to the early lifting from outside to inside and I would not be at all surprised to find in a few years from now, that the indoor treatment will be adopted altogether all over the country. Time will not permit of me going any more elaborately into carnation growing, but I thought it best to make some allusion here to the different methods of carnation culture to show that this branch of Floriculture has not been sufficiently systematized and reduced to a science, as has been done in the cultivation of roses. One reason is that carnations are not so exacting in their requirements as is the rose. They do not require so much heat as roses do, and will do fairly well no matter which of the different treatments are given to them. A night temperature of 50 degrees is high enough for the generality of carnations, but roses need 10 degrees higher at night—say 60 degrees. Before leaving the subject of carnations, I will say that new and greatly improved varieties are being produced and the end is not yet. More rapid progress is being made, I believe, along the lines of improving the varieties of carnations than there is in the roses. The varieties of carnations that were at the heighth of their popularity twenty-five years ago, have been discarded and are almost forgotten, whereas some of the most satisfactory roses that are grown now, were, also grown twenty to twenty-five years ago—American Beauty, for instance.

In conclusion, the financial troubles that struck this and some other countries last fall, have been felt among flower sellers generally, but not so much as might be supposed, considering that flowers are generally thought to be a luxury. Flowers are in these days belived by many people to be among the necessities, as they are and may be used appropriately on all occasions, whether at births, marriages and at deaths; they are never out of place no matter when or where they may be used.

The CHAIRMAN: What shall be done with this excellent paper?

MR. McCLELLAN: I move it be received and placed on file with the rest of the proceedings.

This motion was properly seconded and the question put, and was agreed to.

The CHAIRMAN: Now, we don't like to shut off any discussion that there may be on this subject. If there are any questions, Mr. Lonsdale will no doubt be glad to answer them.

Not hearing any, we will proceed with the next report from the Committee on Forests and Forestry. Is Mr. Piatt in the room?

Mr. Piatt did not appear to be present.

The CHAIRMAN: Mr. Piatt not being here, we will go on to the election of officers.

Mr. MARTIN: I am in receipt of a letter for the Pomologist of the Department, Dr. Funk, in which he requests me to state to the Board some of the reasons that have prevented him from attending this meeting. We are all aware of the very disastrous fire which has visited Boyertown, Dr. Funk's home, and he mourns the loss of a son-in-law and a granddaughter, while his daughter is in bed in a critical condition, having been severely burned in the destruction of the Rhoads Opera House. He wishes me to state to the Board that he will send his report in writing, for publication with the proceedings.

MR. SCHWARZ: I move that Dr. Funk's report be received and printed with the proceedings of the Board, when he sends it.

This motion was properly seconded, and the question having been put, was agreed to.

The CHAIRMAN: I presume it is necessary to appoint a few tellers before proceeding with the election of officers of the Board. I will appoint Mr. Weld and Mr. Naginey to act in this capacity. We are now ready to receive nominations for officers of this Board. The first in order is the President.

MR. HUTCHISON: You mean Vice President. The Governor is President, ex officio.

MR. PERHAM: I nominate Mr. Schwarz.

MR. NAGINEY: I nominate Mr. Fenstermaker.

MR. BARNS: I nominate Mr. Hutchison.

MR. FENSTERMAKER: I would rather withdraw my name. I have had it once, and would rather have some one else take the honor.

A Member: I nominate Mr. Blyholder.

MR. SNAVELY: Have three gentlemen been placed in nomination?

The CHAIRMAN: Yes, sir.

MR. SNAVELY: I move the nominations be closed.

This motion was properly seconded, and upon vote was agreed to.

The CHAIRMAN: I suppose it is the wish of the members present that the Secretary be instructed to cast the ballot for those three gentlemen? The Secretary will please cast the ballot.

The SECRETARY: In accordance with these instructions, I take pleasure in casting the ballot for Messrs. Schwarz, Hutchison and Blyholder, as Vice Presidents of this Board.

The CHAIRMAN: Next in order is the Executive Committee, which consists of eight members. I am now ready to receive nominations for this committee.

MR. KAHLER: I nominate Mr. Glover.

MR. HUTCHISON: I nominate Mr. Snavely.

MR. SCHWARZ: I nominate Mr. Naginey.

A Member: I nominate Mr. Kahler.

A Member: I nominate Mr. Holman.

MR. SCHWARZ: I nominate Mr. Cowan.

A Member: I nominate Mr. McGowan.

MR. SNAVELY: I nominate Mr. Stout.

A Member: I nominate Mr. Rodgers.

A Member: How many names have been placed in nomination?

The SECRETARY: There are nine.

MR. SCHWARZ: I withdraw Mr. Cowan. That will make it eight.

MR. HUTCHISON: I move that the nominations be closed.

This motion having been properly seconded, the question was put, and it was agreed to.

The CHAIRMAN: The Secretary will please cast the ballot for Messrs. Glover, Snavely, Naginey, Kahler, Holman, McGowan, Stout, and Rogders to act as the Executive Committee.

The SECRETARY: In accordance with these instructions, I take pleasure in casting the ballot for these gentlemen named.

The CHAIRMAN: That closes the election. The appointment of the Advisory Committee and the Specialists is made by the Executive Board. Is there any Unfinished Business? That seems to come next on the program.

The SECRETARY: None, that I know of.

MR. SCHWARZ: I move that a committee of three be appointed to call on the Governor and inform him that this Board is in session, and invite him to the meeting.

This motion was duly seconded, and the question having been put, was agreed to.

The CHAIRMAN: I appoint as this committee, Mr. Schwarz,—

MR. SCHWARZ: I decline.

The CHAIRMAN: Mr. Schwarz wishes to decline, and I will therefore name Mr. Perham, Mr. Sexton, and Mr. Eschbach. These gentlemen will please wait on the Governor, inform him we are in session, and bring him over here, if possible.

The SECRETARY: Before proceeding with New Business, I would like to have Mr. Lonsdale's report.

The CHAIRMAN: We are now ready for New Business.

MR. HUTCHISON: I want to suggest that our Legislative Committee draft a bill and present it to the next Legislature in regard to the purchase of grass seeds. This is a very important subject, and other states are regulating their seed supply by legislation. Any man, if you go to buy clover seed, has the right to sell you any obnoxious plant. The same is true of timothy, and any other seed. Then, a certain percentage should be guaranteed to germinate. I don't know a business that would be of such benefit for the Legislative Committee to take up as this one.

The CHAIRMAN: Do you make that as a motion?

MR. HUTCHISON: Yes, sir; I move that the Legislative Committee be instructed to prepare a report regarding the sale of grass and other seeds.

This motion was duly seconded, and the question having been put, was agreed to.

MR. KAHLER: I think this is a very important matter. Those of us who have been to Washington, and seen the tests made, are really surprised to find how little pure clover seed we find in a bushel; after the weeds are taken out, we get very little pure clover seed. Very often for seed that we think we pay ten dollars for, we really pay twenty, because so little of it will germinate. They have a very excellent way of testing it. I am very glad this question was brought up, and I should like to have the Legislative Committee meet for a few minutes after adjournment this morning.

The CHAIRMAN: Mr. Kahler, requests the Legislative Committee to remain a few minutes after adjournment.

MR. HOLMAN: I don't see why we should not have this done the same way as they do in fertilizers, and receive a guarantee of so much pure seed, and so much germinating seed. Now I think the germinating power is of as great importance as the purity of the seed, and I don't see why this can't be done, the same as it is with feed stuffs.

MR. FENSTERMAKER: I find the dealers are getting ahead on the germination point. On the last I bought, I found on the bag "not guaranteed as to germination." That is on the highest priced seed they have.

MR. CLARK: I have no right to speak as a member, but the United States Government is looking into this subject very closely. I have seen some of the best houses that sell or handle seeds send it to the Department for test, and it seems to me that these people should know what seeds will germinate.

MR. KAHLER: I have seen one of the Government laboratories test the seed, and under their test it was easy to pick out every one that would germinate. Now, I think this is a very important matter, and should be given close attention.

MR. SCHWARZ: A number of years ago a firm in New York or New Jersey, I forget which, were furnishing seeds that did not come up to expectation. They were arrested, and they lost the case, and since then they mark all bags that they will not guarantee its germination. They take every precaution to get a pure seed, but will not guarantee it. I see the point. The law can't reach them. They even have it printed in their catalogue, that they do not guarantee the germination. Therefore the law cannot reach them.

MR. McCLELLAN: If the tellers appointed by the Chair are through with their work, it is only a matter of courtesy to relieve them.

The CHAIRMAN: They are relieved without a motion when they are through with their work.

MR. CLARK: The catalogue gives the name and amount of pure seeds to the pound on the best crops. This should enable us to get as close to the pure seed as possible. I don't think any house will quote absolutely pure seed; in all seed there is a certain amount of material that is not pure, but it is cheaper in the end to pay a higher price for seed the largest part of which is pure, than to run the risk of spreading noxious weeds at a lower price.

MR. SCHWARZ: Mr. Chairman, I don't want to give the impression that I am against pure seed; I am simply trying to find out how to reach these people by law.

MR. STOUT: I don't believe that the blame rests entirely on the dealer; he sometimes receives this seed from the farmer who raises it and sells it at a high price.

MR. McCREARY: There is a great deal of complaint on the part of the farmer in regard to clover seed. Why is it that we don't get clover seed like we used to? What is the reason that we get the kind of clover seed that we do? I have grown clover seed for many years, and have raised as high as sixty-two bushels on thirteen acres. We don't get anything like that now, and I attribute it largely to the kind of seed we are getting. We can't grow seed in our neighborhood, and have to send off to get it. We read a great deal about clover seed being used to color calico and all kinds of articles, and I should not wonder but we get it back after the germination has all been dyed out of it. Is there any way of preventing this, and securing good seed, seed that is fresh?

The SECRETARY: In answer to the question which was put by Mr. Schwarz, I would suggest that possibly we might be able to pass a law that dealers in grass and other seeds shall guarantee a per centage of seeds that will germinate. We have an Act of Assembly providing that the manufacturers of fertilizers shall guarantee the amount of plant food in the articles they place on the market. I have not thought of this at all, but I think it would be competent for the legislature to pass a bill that shall guarantee the per cent. of seeds that will germinate. That would make it necessary for the legislature to provide a means by which the seeds could be tested to see if they come up to the requirements. That would probably fall to this Department; it is getting its hands pretty full, but I think we could possibly take care of it. I know we will be able to do so while I am at the head of the Department. We want to do all we can to protect the interests of the State.

MR. HOLMAN: There is one firm in this State that makes an effort to sell only seeds that will germinate. If you go to them and ask for a sample of alfalfa seed to test, to see whether it will germinate, they will say to you "why certainly; we are just as anxious to sell good seeds as you are to buy them." Of course, it is a matter of self-protection with them. They want to keep their trade.

The SECRETARY: It will be just as easy for the seedsman, as for the manufacturer of fertilizers, to put on their bags the percentage of good seeds the bag contains.

MR. SNAVELY: I think this question of germination is a somewhat difficult one, because we have to take the question of temperature into consideration. A seed that will germinate at 80 or 100 degrees Fahrenheit will give you different results where the temperature is lower, so that you will have to take the question of temperature into consideration.

The CHAIRMAN: Are you ready for the question?

MR. BARNES: There is one suggestion I should like to make in reference to this question of clover seed; All the clover seed that is used on our farms does not come from the dealers; often it is procured from neighboring farmers, and we find just as much difficulty in getting good seed from them as from the dealers.

MR SHARPLESS: I presume most farmers follow the practice of planting clover seed in the spring of the year, in the wheat stubble. We have always done so, too, but this year was an exception to our rule. Immediately after harvest we plowed the wheat stubble, and made a good bed, and about the 20th of August we had a second crop of clover. Our section being a dairy section, we do not grow clover for seed, but in other sections I have seen prize clover seed prepared immediately after harvest.

The CHAIRMAN: As many as are in favor of Mr. Hutchison's motion relative to instructing the Legislative Committee to prepare a bill in regard to pure seed, will vote "aye," the others "no," as usual.

This vote was agreed to.

The CHAIRMAN: I will now ask Mr Schwarz to take the chair.

MR. SCHWARZ: Members of the Board of Agriculture: I am quite sure that I am highly flattered by the honor you have bestowed on me, not only because it is an honor, but because it is a mark of your confidence in me.

The SECRETARY: I have noticed that several gentlemen have arisen with hesitation, as though they were not quite sure of their right to take part in the discussion, and I have noticed several gentlemen come in who, while not members, are interested in agriculture. I therefore move that we have an open session, and invite all who are interested to take part with us and give them the privilege of the floor and request them to hand their names to the Secretary, so that we may have a record of their presence.

This motion was duly seconded, and the question put, and it was carried.

The CHAIRMAN: Next in order is New Business.

MR. HERR: Under the heading of New Business would come the selection of the next place of meeting of the Board, and for the Round-up Meeting of the Institutes.

The CHAIRMAN: Suggestions are in order.

MR. McCREARY: I rise to suggest our town of New Castle as the place for the summer meeting. We have a very pleasant town, with excellent hotel accommodations, and there is none with better railroad facilities. You can get there and away at any time. There are seven trunk lines meet there. We have never had a meeting of the State Board there but once, and that was way back, a number of years ago, and a number of our members spoke to me a year ago, and said they would like to go to the western part of the State this year; our people are very anxious that I shall come here and ask for the meeting to be held at New Castle.

The CHAIRMAN: New Castle has been named. Are there any other suggestions?

GEN. BEAVER: I don't know just how far the several localities in the Commonwealth would like to be heard and have the Board meet there, but it has occurred to me more than once that it would be a good thing to have the Board come up to State College. We are all interested in it, and I would say that since the Board met there last there have been a number of important features added to the course. Agronomy and Horticulture have been added, and it has been completely reorganized. We had a Farmers' Week not long ago, and three hundred and fifty of them came to the most enthusiastic meeting of farmers that I ever saw. You could go to three or four places at once if you had the ability to do so. There was Prof. Van Norman teaching the good points of dairy cows, with a cow beside him; Jimmy Rice of Cornell told what a chicken is. Prof. Walters told about market gardening, in a way that was perfectly illuminating to you. Now, as I understand that the Board meets in May, does it not Mr. Chairman?—

The CHAIRMAN: The time is fixed by the Department; either the latter part of May or early in June.

GEN. BEAVER: If you come in the month of May, you will find nearly twelve hundred students on the campus, nearly two hundred of them studying agriculture. That does not look as if agriculture were dying out, does it? If the Governor were here he could tell you just what kind of buttermilk they make up there; he and I touched glasses when he was up.

You will find the School of Agriculture and see market gardening in full sway.

Now, I did not come here for the purpose of inviting the Board to meet at State College, but Dr. Hunt, the Dean, said to me just now that it would be a very desirable place for the Board to meet and see how things are done there, and so, Mr. Chairman, on behalf of the faculty of State College, on behalf of the Trustees, and on behalf of the great student body there, I invite you to hold the summer meeting of the Board, and the round-up meeting of the Institutes at State College. I believe that the Institute lecturers would be able to secure more material for their next season's work there than anywhere else. Traveling expenses will not be more than to any other point. There is only one hotel there, but at McAllister Hall there is room for nine hundred. In that respect you could be taken care of, or if too many of you came, Dr. Hunt would at least see that you had a clean sheet and a blanket and a cot, and we can assure you of something to eat, at least as good as you get anywhere else. We therefore all join in a very hearty invitation to you to come up to State College. The State Teachers' Association meets there in July, and during Farmers' Week there were at least four Superintendents of counties up there to study agriculture with a view to teaching it in the schools—they came from Berks, Columbia, Clinton and Centre, and from one of these counties the Superintendent brought twenty-one teachers with him, to get an insight into the new agriculture that will be taught in the schools.

MR. HERR: The time of meeting is left to the discretion of Mr. Martin, the Deputy Secretary of Agriculture. Last year it was the first week in June. The fiscal year ends the last of May or first of June. I suppose if we go up there, the earlier the better will suit the College.

The SECRETARY: If held in June, it would be the very early part of the month.

GEN. BEAVER: Our Commencement is in the latter part of June —the 17th, I think, and the latter part of May or early in June will do very well. If you men saw the twelve hundred earnest young fellows up there, you would begin to believe that agriculture has about come into its own.

The CHAIRMAN: New Castle and State College have been named as places of meeting. Are there any others?

MR. HALL: I cannot remember that the Board met in Potter County, but if you will come to Coudersport, we shall be very glad to have you, and will show some of you fellows in the central and southern parts of the State how we do things up in the north. We have good hotel accommodations, and can have the use of the Court House the last week in May or early in June, and we shall be very glad to have you come up there and meet with us.

The CHAIRMAN: Any further suggestions? We have three names.

MR. McCLELLAN: Inasmuch as Mr. McCreary offers us the privilege of going to New Castle, I think it would be very nice to meet in the western part of the State. A great many of the eastern people would like to go to the west this year, and so far as the expense is concerned, it can't matter very much whether the western people come east, as they did last summer, or whether the eastern people go west.

MR. HUTCHISON: Mr. McCreary spoke to me when I came in here about going up to New Castle, and I said "that is fine." None of the faculty or trustees said a word to me about having the meeting up at State College, but now that they have asked us to go there, I will have to ask my friend to release me from my promise to vote for New Castle. I think it will be a fine thing to have the Round-up Meeting of the Institutes at State College, and see the changes and improvements that have taken place there, and get in touch with things as they are done there. If my friend will release me, I will vote for the college.

MR. McCREARY: I can't release anybody. You can go to State College at any time, and it is not so long since we were there, either. We can take care of you up at New Castle, and if not, I guess I am good for the whole shooting match.

MR. McGOWAN: It was my purpose to extend an invitation to come to Reading, Berks County, our county-seat, but on reflection that the Board met at Allentown—which is not very far away from us, last summer, it seemed to me as only fair that this meeting of the Board should go to the western part of the State. We have been to State College, and I think we owe it to the west to go there this time. I don't think we have been there for eight or nine years.

MR. HERR: I move the Secretary call the roll, and each member respond as to place.

This motion was properly seconded, and the question put, and was agreed to.

Roll call by the Secretary showed as follows:

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| New Castle | 20 votes. |
| State College | 13 votes. |

MR. HUTCHISON: I move that the selection be made unanimous.

The motion was properly seconded, and upon the question having been put, was agreed to.

New Castle was unanimously named as the place for the summer meeting.

The CHAIRMAN: Any other new business? If not, the Chair would suggest that we have present with us a gentleman who takes a great interest in our work, who was once at the head of the Department, and from whom we would like to hear. I refer to Prof. Hamilton of Washington.

PROF. HAMILTON: Inasmuch as I am to occupy more than my share of time this afternoon, I beg to be excused now.

The CHAIRMAN: Any further business?

MR. HERR: I move that we hear from General Beaver. He is always loaded.

This motion was seconded and carried.

## ADDRESS OF GENERAL BEAVER.

Mr. Chairman, I am gratified by the honor you have just done me in calling on me at this time. From what my friend Herr, says, it might be inferred that I am loaded at the wrong end. I did not expect to say anything on agriculture this morning, and my thoughts are in such shape that I am afraid they will hardly be helpful to any one of you.

To be a successful farmer a man must necessarily know other things, and must keep in touch with the progress that is made. One thing I think in which more progress has been made this year than in any other line of agriculture, is in the matter of soil analysis, and I have been strongly impressed by the importance of this subject. How and where and why to place things so as to get the best results is of the greatest importance to the farmer. Up at State College we recently purchased a farm, not quite adjoining our property, but one with many desirable features, with the object in view of converting it into an orchard. The orchardist came and analyzed the soil. There was an open, well-turned piece of ground, that it occurred to me was just the thing, but he did not agree with me. We went up and down that ground, and he said "here a Baldwin apple will grow," and again "here they won't grow." This soil expert found there were twenty different areas. The elements of the soil contribute largely to the life of the tree and its fruit, and he found these elements varied, so he could tell where the fruit would grow and where it would not. I don't know whether he is right or not. Time will tell; but the soil expert was very positive, and willing to stake his reputation upon it. This was the first time my attention was called to the necessity of knowing the soil if we want to be sure of our product.

To come nearer home, I represent the heirs in a certain farm that is being conducted on shares. We have been putting commercial fertilizer on the soil, and heretofore I have always left the selection to the farmer; he would send in a bill for two-fifths of it, and I would pay it. I said "this year I want to look into it; I don't believe that we have been putting the right thing on that soil; what we need is nitrogen, and I want you to take a little can of the soil, and take it to Dr. Frear at State College and have him analyze it; I believe what the soil needs is nitrogen, and not potash." It is an old furnace quarry, in which they burned charcoal for many years. Dr. Frear's analysis bore out my impression, and I said to the farmer, "now we will have to get the nitrogen; we have potash enough." "But," he said, "I can't afford it." "Well," I said, "if you will take my way I will pay half of it instead of two-fifths, and then the difference will not be so much to you; it is the difference between $23 and $13, and if the crop then doesn't beat anything you ever had, I'll pay the whole of it." So on the strength of that our farmer agreed to do as I suggested. Well, the other day that farmer came into town to see me, and I said to him "Johnson, what would you say as to our prospects of a wheat crop next year?" "The best outlook I ever saw," he said. I don't know whether we will get so large a crop this year, as a good strong grain, that will carry with it the virtue of the nitrogen which we have put on the soil. Now, this proved to me that the great thing for every farmer to know is what he has in his soil, and what he requires to make it produce the crop he expects. Do you want a Baldwin apple? Ascertain whether the soil is suited for a Baldwin or for a Pippin, or for anything else. These learned scientists can tell you the reason; I can simply tell you the fact, that you must know what is already in the soil to adapt it for the purpose you want it, in order to produce the result.

Now, I believe that this is worth studying in Pennsylvania, and I believe that it would pay every farmer who has not already done so, to go up to the College and take a short course, and find out what there is in associating with these scientists, that they can tell you just what is already in the soil, and what you must put there in order to produce a crop. Of course, you may have a little round-a-bout way in finding this out for yourself. In order to secure results you may have to raise clover before you raise other things, to restore the nitrogenous food, but they can tell you that sometimes even clover won't do it; and they tell you to raise field peas and beans in order to prepare the soil to raise other crops. But the first thing to do is to ascertain what you have. That does not take any great knowledge; it doesn't take four years at college to ascertain how to do that thing. Why, I have heard what was to me a perfectly ridiculous proposition, come from no less a person that the man who has just been elected Prof. of Horticulture at State College. Between State College and Buffalo Run there is a stretch which has heretofore been called "the Barrens," and he assured me that these barrens could be made at least as productive as the sandy soil of New Jersey for market gardening. We all know what the people over there have done with the sands of New Jersey, and his proposition seemed to me just as ridiculous a thing as I ever heard, but he has a farm on the top of the Alleghenies, which he calls "Scalp Level," out of which he has made from four to five thousand dollars a year in market gardening. Now, if that is so, it is worth a great deal. These barrens, where all the timber has been taken off for the last hundred years to make barrel staves, until it is covered with nothing but pen-oak brush, can be made very profitable, he says. How? By analyzing the soil, and seeing what it wants.

That is the message that comes to me at this time, and it is a message that will help agriculture. Not that there is any science in it; it is only common sense. You don't draw on your bank account unless you put something in that bank, and then you can only draw out what you have put in, unless you are one of the favored few who are allowed to overdraw their bank accounts. The great thing here in Pennsylvania is to continue the soil survey which has been commenced by the Department at Washington. A good deal has already been done out in Centre County, and I think the good work will be continued if the Department of Agriculture is encouraged in it. A man by the name of Atherton, I think, has been telling the readers of the Saturday Evening Post that the land of Southern Illinois, which used to be considered the finest in the country, has deteriorated to such an extent that they cannot raise twenty-five bushels of corn to the acre. They have been planting corn for fifty years, and nothing but corn, and they have taken out of the soil all that goes to produce corn. We in Pennsylvania have done a little better, because we include clover; if we don't turn down the tops, we at least turn down the roots, and they give us the bacteria which we need, to keep up the fertility of the soil. Now, let us encourage the Department of Agriculture in every way we can to continue this work of soil analysis with us, so that we may understand just what we are doing, and what the soils require in order, to produce the results we are looking for.

The CHAIRMAN: I notice that the Committee appointed to wait on the Governor has returned; what is the result?

MR. PERHAM: We found him very busy and his time entirely occupied for to-day, but he will honor us with his presence to-morrow morning at ten o'clock.

The SECRETARY: I suggest that this Committee be continued to wait further on the Governor, and conduct him to the meeting at the proper time.

MR. HERR: I move we adjourn until this afternoon.

This motion was properly seconded, and the question put, and was agreed to.

The CHAIRMAN: The meeting stands adjourned until half past one this afternoon.

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Wednesday, January 22, 1908, 1.30 P. M.

Mr. Schwarz in the Chair.

The CHAIRMAN: We will now proceed with the regular order of business; reports of Standing Committees will be called for. Is Mr. Piatt in the room? We have not yet heard his report on Forests and Forestry.

Mr. Piatt did not appear to be present.

The CHAIRMAN: The report of the Botanist comes next. Is Prof. Buckhout here?

The SECRETARY: Prof. Buckhout is not here, but his report is. I have not had time to go over it, and it is a little difficult to read, but if the Board so desires, I will endeavor to read it.

The CHAIRMAN: What is the pleasure of the meeting.

MR. STOUT: If it is not necessary to have it read, I would suggest that it be handed over to the Secretary for filing and printing with the other proceedings.

The CHAIRMAN: Do you make a motion to that effect?

MR. STOUT: Yes, sir.

PROF. SURFACE: How would it be if a man is not able to be here at the time he is called for, but comes in later? Would it not be well to give him an opportunity to present his report? If strictly carried out, this would prevent my fellow entomologist from presenting his report. He is unable to be here until later.

The CHAIRMAN: Will Mr. Stout accept the amendment?

MR. STOUT: I do.

This motion, as amended, was duly seconded, and upon the question having been put, was agreed to.

The report of the Botanist is as follows:

## REPORT OF THE BOTANIST.

PROF. W. A. BUCKHOUT, *State College.*

My correspondence during the past year has been somewhat less than in former years and has involved nothing out of the ordinary. The same matters come up periodically year after year, and hence I need only briefly repeat what has been said before.

Seeds, particularly clover and alfalfa, come in for determination of purity. While samples of seed vary somewhat, none that have come into my hands are especially bad. They generally contain a few scattering seeds of various weeds, quite frequently of dodder, which is so small as to be difficult to detect. The danger from dodder, however, is quite small and local. Should it get a foothold it is easily destroyed by cutting before it has chance to form seed for another year. It is quite temporary. The greatest danger from impure seed of all kinds arises from the ignorance and inattention of the small dealers. If the business could be confined to those who make a business of seeds and take pains to inform themselves of the quality and character of their goods, there would be very little to complain of.

Weeds and plants for identification were in the usual variety. There is no "best" way to exterminate weeds, outside of the common sense of each case. Write to the Department of Agriculture, Washington, D. C., for "Farmers Bulletin No. 28, 'Weeds and How to Kill Them.'" Study your case as you would any other problem and act accordingly.

There is more or less inquiry respecting cultivation of medicinal plants. The one thing to remember regarding them is that they are so different and apart from the ordinary plants of cultivation that there is no similarity between them. It is absurd to talk of cultivating or raising them in the ordinary use of those words. Generally, returns from them come only after several years, during which time they must be cared for in peculiar ways and guarded from special dangers. An intending grower should carefully inform himself beforehand, as much so as one not a horseman should take a course in horse training before he enters the field with veteran jockeys.

The value of nearly all medicinal plants is small, when one considers the difficulties of production and the risks of handling. The same amount of energy in other directions would be more profitable. The most conspicuous example, ginseng, the writer has no faith in whatever. It has no medicinal value. Its use is founded upon ignorance and superstition. Its cultivation is bolstered up by "promoters," who are interested in selling roots and seeds at extravagant prices. Intending cultivators will do well to read the history of a somewhat parallel case, "The Multicaulis Craze," "The Evolution of our Native Fruits," by Bailey, page 141-158.

Plants for name take, of course, a wide range. Most of them have no economic value. As a general rule only meager fragments are sent. One of the most interesting cases I ever had, from the point of a mere detection or determination, consisted of a few dry stems, perfectly bare, perhaps three or four inches long, and a mass of comminuted fragments which could have all been held in a lady's thimble.

The lack of green leaves showed it a parasite; the presence of seeds, a flowering plant; character of the seeds and the capsules in which they were borne, a particular species, "beechdrops" (Epiphegus Virginiana). Its unusual appearance suggested to the sender a possible medicinal value, which it has not.

There were several cases of plant diseases. The most marked was of lettuce. This plant is raised in large quanities under circumstances which make it subject to several diseases which are often so serious as to prevent its successful cultivation. While these maladies are now well known to the plant pathologist, satisfactory remedies for them are very difficult to find, and still more difficult to employ. Since lettuce for table use should be clean and crisp any stunting of growth or even slight leaf imperfection makes it useless for market. Hence the most practicable remedy consists in stimulating a rapid growth in the plant in the hope that it will thereby be resistant to attack. Lettuce growers have by long experience determined the best conditions of soil, temperature, watering and light which the plant needs. Oftentimes their best efforts are thwarted by an insiduous blight or rot against which they are for the time being powerless. I believe that in many such instances the best thing to do is to temporarily abandon lettuce growing for a season or two, utilize the facilities for some other crop, and then return to lettuce raising again after the soil and surroundings have been freed from lettuce diseases. It will be the cheapest and most satisfactory in the end.

An interesting point was raised, whether barberry hedges are to be condemned because of the known fact that they harbor and support one of the stages of wheat rust, a parasitic disease to which wheat is subject. Since the life history of wheat rust is so thoroughly known and the part which the barberry plays in it, it would seem that there could be no room for doubt, and that barberry bushes should not be allowed. But we find, in our locality at least, that the barberry is but seldom infected, and true wheat rust is not a serious disease. Moreover, recent studies of rust have shown that it is capable of continuous development, independent of the stage sometimes found upon the barberry. Hence the presence of barberry bushes appears of at least much less significance than was formerly supposed. None the less, considering how easily a fungus outbreak may appear under conditions favorable to the species, it would be well not to use the common barberries so abundantly as hedges would require. As to Barberis thunbergii, the low growing Japanese species, now so popular for ornamental planting, the writer believes the danger to be so slight that it may be ignored, since the rust has never yet been found upon it.

The CHAIRMAN: Next in order is the report of the Entomologist. We will now have the pleasure of hearing from Prof. Surface.

Report of the Entomologist is as follows:

## REPORT OF ENTOMOLOGIST NO. 1.

BY PROF. H. A. SURFACE, *Harrisburg, Pa.*

To me falls the duty of rendering to you a report of the entomological conditions in Pennsylvania during the year 1907. I have no way of knowing how much of my correspondence and service regarding insects is due to my position with this respected Board, but I know that in the capacity of Economic Zoologist of this Commonwealth our chief correspondence, publications and practical work has been along this line. We have, therefore, been in position to watch closely the outbreaks of injurious insects, the remedies that have been used successfully or otherwise in their repression, the enemies of insects and the appearance of literature upon this subject as well as the undoubtedly increased attention given it by the public.

We rejoice to say that with our other insect troubles, we have not been invaded with such destructive pests as the West Indian Peach Scale, the Brown Scale, the Gypsy Moth and the Brown Tail

Moth. While we recognize the serious effects of the San José Scale and the great havoc it has played in this State we are certain that the conditions would be much worse were any one or more of the above named pests to be established within this Commonwealth. Therefore, it is important that we watch for them and guard carefully against their introduction, and should they become established it is necessary to take all possible means of stamping them out at once.

The worst pest, of course, attacking vegetation in this State is the San José Scale, which has been responsible for the destruction of millions of dollars' worth of fruit trees, and which is causing an annual loss of hundreds of thousands of dollars' worth of property in the State and reducing our fruit and fruit prospects. In many of the large fruit-growing districts two or three years ago nearly all the horticulturists were discouraged with it and ready to quit, but we are pleased to be able to report that now they have taken new courage and are producing almost perfect fruit in spite of the presence of the San José Scale. They are learning to keep such pests in check by the most simple, cheap and efficient remedies.

Where there is a great demand there will eventually appear a great supply. This State has experienced a very urgent demand for an effective and convenient insecticide. As a consequence, materials of many kinds have been placed upon the market. While we can not discuss here in detail the various remedies for the San José Scale, it appears important for us to say that it has been demonstrated beyond doubt that the best and cheapest remedy for this pest is the lime-sulphur wash:

17 pounds lime, 22 pounds sulphur, water to boil an hour, boil, strain and add water to make 50 gallons, and spray by giving two good coats over all the bark.

Fortunately, two or three companies are now making commercial preparations of the lime-sulphur compound, which are effective and which although costing a little more than the home-made lime-sulphur wash are not nearly as expensive as the commercial oil preparations now on the market, and this has the additional advantage over the oils of being a fungicide as well as an insecticide. It is our pleasure to report that the material made and sold as "Ska-Kill," at Waynesboro, Pa., has been withdrawn from manufacture and sale. It has proven entirely inefficient and unsatisfactory, as we indicated it would, and demonstrated it by actual test. We hope to see all commercial materials that fail to give satisfactory results properly exposed, in order that purchasers may act intelligently in attempting to suppress pests with such insecticides. For this reason, we deem it necessary to call attention to one of the so-called soluble oil preparations sold under the name of "Target Brand," made at Martinsburg, W. Va., which is reported to us from different sources as having resulted in the destruction of trees to which it was applied. It is important for our practical fruit growers to know that such unfortunate results have been obtained by their brother horticulturists and are liable to recur at any time and place.

Attention should be called to the experiments which have been conducted by the Division of Zoology of the State Department of Agriculture and of which publication has been made in the Monthly Bulletins of said Division. Practically all insect pests in this State have been therein discussed and formulæ for suppressing the same have been published in the May, June and July numbers. These may be obtained free by writing for them. Also the various Experiment Stations and the U. S. Department of Agriculture have published extensively upon entomological topics, and persons interested may obtain literature without charge upon almost any topic he may desire. Upon the insects concerning which we have had considerable correspondence in this State during the last year are the following:

Ants on lawns, in houses, in cornfields, attending aphids or plant lice, on fruit trees, and otherwise. We have shown that ants in lawns can be destroyed by making holes in the ground reaching to the bottom of their nests and into each hole pouring a half teaspoonful of Carbon Bisulfid. From houses they are best exterminated by tracing their path or line they follow to their nests and pouring benzine or gasoline into the nest to destroy the queen. Ants in cornfields, in the spring, have proven annoying, not by their direct injury, but by taking care of the plant lice which infest the roots of corn plants and prove quite obnoxious. To overcome this it is best to plow the ground in the fall, and cultivate it as late as possible until it freezes, and in the early spring cultivate again with a spring-toothed harrow, then harrow it later and plant the corn late after having kept down the weeds and grass of early spring. Many persons see the ants on trees or shrubs and ask for a remedy. It is not the ants that should be remedied, but the plant lice, which are attracting these little insects. Many ants are seen going up and down trees, and it may almost always be taken that it is because either plant lice or scale insects are present on the branches or leaves of the trees, and by the sweet secretions called honey dew, they are furnishing food to the ants. Contact insecticides ridding the trees of suctorial pests will soon result in the disappearance of the ants.

Aphids and plant lice have been the subject of a great deal of correspondence. They are especially liable to appear upon the leaves of trees during the early summer and cause these leaves to become deformed or twisted out of shape. Within the leaf and upon the branches beneath them, as well as upon the ground, are often found glistening or shiny drops and rather black sooty spots. These shiny drops looking like honey are called honey dew, and the dark spots are the results of a fungus developing in the honey dew. The best remedy for plant lice is to spray with contact insecticides, such as one pound of whale oil soap dissolved in six gallons of water, applied just as the buds are bursting, or the lime-sulphur solution applied as for San José Scale, applying it after the buds swell and just when the first of them commence, to burst and show green. We have sprayed trees with the green leaves quite apparent and the pink of the blossoms commencing to show, and have killed the scale insects and plant lice without injury to the leaves or fruit. The lime-sulphur regularly recommended was used for this.

The apple aphis passes the winter in the form of eggs on the branches of the trees, and is thus easily reached by a good contact insecticide. I have also had very positive reports of the cherry aphis, sometimes called the brown plant lice, having been destroyed by the spring application of the lime-sulphur wash for San José Scale. In some portions of this State the Green Louse or Plant Louse on the potato has been so abundant as to have proven destructive, but it can be held in check by spraying with whale oil soap solution or strong decoction of tobacco or eight per cent. kerosene emulsion. The Gray Maple Aphis has caused a great deal of alarm by its appearance on the under sides of Norway maple shade trees along streets, and causing the leaves to fall abundantly about midsummer. While this was unusually abundant during the past year, we do not generally consider it such that it is necessary to take practical steps for its control, but if such should be thought necessary, it should be sufficient to spray thoroughly with a mild contact insecticide.

The Wooly Aphis is a very serious orchard pest. This little bluish white plant louse is to be found in most orchards where the bark has been slightly injured. It attacks the branches, the trunk or the roots. By looking around the edge of the injured spot a bluish-white ring may be often seen. Upon examination this is found to consist of these little pests, sometimes looking as though covered with flour. It is best to treat them either by spraying or by washing the injury with a brush dipped into a mixture of pure white lead and linseed oil or a very strong solution of soap or soft soap. Where this occurs upon the roots of trees, it is advisable to bury an abundance of tobacco dust around the roots. This not only acts as a very good orchard fertilizer, being worth about at least twenty dollars per ton for this purpose, but also acts as a valuable insecticide in destroying such pests as Wooly Aphis and other root-infesting insects.

Bagworms have attracted considerable attention by their unusual numbers and destruction of foliage, but as these are so easily seen while the trees are dormant, and so easily killed, both by hand picking at that time, and by spraying with arsenical poisons after the leaves appear, there is no reason why injury should be experienced by this pest. Household pests, such as Cockroaches, Bedbugs, Flies, Fleas and other insects, have been the subject of much inquiry, and have been controlled satisfactorily, and in fact in many houses were entirely exterminated by thoroughly and properly fumigating with hydrocyanic acid gas. There is no reason why one should suffer from such pests after having been informed of the efficiency and ease with which they can be exterminated.

The subject of bees and bee-keeping has received considerable attention from the members of the State Bee-Keepers' Association and others, and several persons have tried bees of the various races. It is generally accepted that the Italian is the standard race of bees known to American bee-keepers at present.

Among beetles, the Asparagus Beetle has been extending its range over the State, but as this is easy to keep in check by dusting with freshly slaked lime, or with flour and Paris Green, one part of the poison to forty parts of flour, there is no reason why it should be very destructive. The Striped Cucumber Beetle was abundant and injurious in most parts of this State, but is prevented chiefly by covering the plants with netting until the vines start to run. The unquesionably good effects of Lady Beetles as destroyers of obnoxious insects, and especially of young scale insects and plant lice, are noted many times. Also the value of the Ground Beetles as predaceous insects in destroying larvæ and other insects. Bark Beetles have continued to bore their little round holes through the bark of trees that are declining and hasten their death, giving the appearance of having been in many cases the sole cause of the trouble. It is to be remembered that wherever a branch is dying through having become broken or otherwise, the Bark Beetle is ready to attack it, and oftentimes we see the work of the Shot-Hole Borer, and as this is in a tree that is already dead or dying, we think it is more destructive than the facts warrant. If trees are so declining as to be attacked by the Shot-Hole Borers, they should be cut and burned, and thus prevent the spread of the pests to other trees.

Borers of fruit trees have been unusually active, but the fruit growers have had another year to test the efficiency of pure linseed oil and white lead used as paint, applied during the early part of the summer to prevent such pests as well as later ravages by rats and mice. We have seen thousands of apple trees so painted and no injury has come. In fact we have tried it in our own peach trees, and although this was done last summer, we can not yet report injury, yet we still call attention to the fact that the Peach-tree Borer is an insect that works lower in the ground, and is not to be prevented by this method. Therefore it is scarcely necessary to paint any but apple, pear and quince in order to prevent the attacks of Borers. The Peach Twig Borer has occurred in this State as a comparatively new pest. It is to be destroyed by the regular formula for spraying with the lime-sulphur wash for the San José Scale and at the same time of year as recommended for this pest. The Borer in potato plants and many other forms of vegetation has proven quite destructive and has attracted considerable attention. Since this lives chiefly in large weeds or rushes, like bull weeds and artichokes, it is very important to destroy these larger weeds by mowing them two or three times during the summer. This pest can then be kept in check by thorough cultivation of plants and by burning as soon as they appear to wilt from the effects of its infestation.

The Cabbage Root Maggot has been unusually severe and has destroyed much of the early planted cabbage as well as turnips and radishes. Our experiments have proven that it is best to prevent this by putting a band or disk of tarred paper around the plant at the time it is set. These can be cut very rapidly with a punch somewhat like a wad cutter for gun wads. They should be nearly ten inches in diameter and slit in the centre to let them be passed around the plant. If plants be not thus protected and later be infested with the Rootworm, this pest can be killed by treating with carbolic emulsion as discussed in the Monthly Bulletin of the Economic Zoologist for March, 1907. Fortunately, the late cabbage is not infested with this pest as much as is the early planted, and therefore, it is recommended to plant late that which is needed for the winter supply and for making sourkraut and the chief family use of the year.

The Green Worm or Larvæ of the White Butterfly has not been known to be so destructive during the past year for the reason that the more extensive gardeners and truckers have now learned to control it by simply spraying with arsenate of lead or Paris Green applied at any time when the pests are present and before the heads are three-fourths grown. Also dusting with Flour and Paris Green while the leaves are damp with dew will prove effective. Use one part of Paris Green to forty parts of Flour. We know where poisons have been used on cabbage for this pest for years without evil results.

Cabbage Plant Lice have proven quite destructive and should be killed by spraying with whale oil soap, one pound in six gallons of water, or similar insecticide are recommended for Aphids.

The Curculio has been as abundant as ever on peach, plum, cherry and quince, but is being held in check by many orchardists by spraying with arsenate of lead in Bordeaux mixture and combining this with jarring of the trees in the morning to catch the pests.

A few correspondents reported Cutworms in abundance, but this was only on sod ground, and where the ground was plowed in the fall and the insects exposed by late fall and early spring cultivation, they were not found so destructive. Also their experiments in using poisoned bran for these pests were very successful, as was published in one of our bulletins for last spring.

The European Fruit Scale, Forbes' Scale and Putman's Scale are species of the genus Aspidiotus, thus belonging to the same genus as the San José Scale and closely resembling the last-named pest. They have been found very extensively by our inspectors and it is not infrequent that an error is made by confusing these with San José Scale. They are not so destructive and need not cause undue alarm. Flea Beetles have been present and especially destructive on potatoes by gnawing holes in the epidermis and making the leaves appear to be specked with brown. However, they are repelled or destroyed by spraying with Bordeaux mixture with an arsenical poison added.

The grain pest known as the Angoumois Grain Moth has continued its destructiveness, especially in the southeastern portion of this State. However, we have had some excellent reports of loss prevented by this pest by threshing the grain early and getting it into the bin rather than leaving it in the straw. One person in particular reported to us that he had threshed about one-half of his crop shortly after harvest and the other half was left until the early part of the winter. The former was not injured by the Grain Moth, while the latter was practically destroyed. This is in accordance with our recommendations.

Grasshoppers have been observed by us as serious enemies of fruit by gnawing peaches through the skin at the upper side as they are ripening, especially during the very dry part of the year which, of course, is the growing side, and resulting in decided blemishes. We have also had reports of their destroying tobacco and eating the leaves and fruit of melons. We recommend poisoning them with the Criddle Mixture or spraying with sweetened arsenical poison. The Criddle Mixture is discussed in the Bulletin of the Division of Zoology for last May.

The Hessian Fly has not been so destructive as during some years, but as usual the wheat planted early has been generally infested more or less.

Lady Beetles as beneficial insects have been reported from a great many different sources. Leaf Hoppers on rose, apple and potatoes have been injurious in some places, but have been destroyed by two or three applications of contact insecticides, such as are recommended for plant lice. Maggots or the larvæ of the flies in raspberry canes have appeared in some parts of this State, thus causing a wilting down of the tips during the summer. They should be cut and burned when found infested. The Mediterranean Flour Moth has been destructive in mills and graneries in the eastern parts of this State, and it has also spread to the extreme northern or western portions of the State, but has been cleaned up satisfactorily by two fumigations at intervals of about one week with hydrocyanic acid gas. In some of the larger mills this operation has cost over fifty dollars for the fumigation, but has given very satisfactory results in destroying all insects in the building as well as mice and rats by the bushel.

Mites, especially the Red Mites, have been reported injuring many varieties of trees, shrubs, ornamental plants and shrubbery, and have been controlled by spraying with the lime-sulphur wash, the same as for the San José Scale, or with contact insecticides containing Sulphur or Sulphur Compounds. Slugs on cherry and pear trees have been very abundant and destructive, but easily killed by dusting with freshly-slaked lime with about one-fortieth part of Paris Green added. Spraying is becoming far more extensive than ever before and our citizens are producing better fruits, planting young orchards and having better results and a more hopeful outlook than has previously been known in this State.

The CHAIRMAN: Is there any desire to discuss this admirable paper?

A Member: I have on my premises a black scale, and I infer from what you said, that it is the same thing you are speaking of.

PROF. SURFACE: Very likely it is. I might add that last year the State of Massachusetts appropriated the sum of $300,000, and the United States Government the same amount, for the purpose of fighting the Gypsy Moth.

Then there is another thing that I would like the opportunity of saying a few words about, and that is the study we are taking up of these questions in the way of actual demonstration orchards. We are trying to see how to produce a perfect tree, and to this end we are studying budding and top grafting, the pruning of the tree, the scale, the question of fertilizers, and every thing else connected with the life of the tree. I am conducting experiments of this nature in my own orchard, and at the suggestion of the Secretary, we are trying to secure the orchards at the County Homes, or other public enterprises, for this purpose. I am now giving instructions to about twenty-five men, who are conducting a demonstration orchard at Mechanicsburg, not so far away from here. Next year, if our plan works out, we will have an object lesson that may tend to the development of orcharding in this State and elsewhere, and I trust will be of great service.

MR. FENSTEMAKER: Where can you buy this prepared lime and sulphur wash?

PROF. SURFACE: Of most any dealer in horticultural supplies and implements. Mr. Stout asked a question about a small scale, similar to the San José Scale; what was it?

MR. STOUT: It was entirely black and quite round.

PROF. SURFACE: That was another species of the Oyster Shell Scale. It has a shiny black centre. I would recommend care where such fruit is used that the parings be burned up. At this time of the year there is no danger, but in the summer there may be danger of scattering the disease.

MR. STOUT: What effect would salt have on the aphis in the ground?

PROF. SURFACE: It would have to be so strong as to destroy almost any plant except perhaps the asparagus.

MR. SCHWARZ: Is not the use of Paris Green on cabbage rather dangerous?

PROF. SURFACE: I thought so until I talked with a market gardener who has been using it for years. They go out at night and apply it on account of the prejudice against it, but he has used it for ten years, and no damage has resulted, and another man has used it for thirty years without any injurious results. I then asked an entomologist, and he said it would be necessary to eat about two hundred heads of the cabbage before producing any effect. If the cabbage heads be bored by a kind of a climbing cutworm so that the holes are bored into the solid white head of the cabbage, then it is not right to use any poisons, but owing to the cabbage growing from within, Paris Green can be put on the outside with perfect safety.

The CHAIRMAN: Are there any further questions? If not, what shall be done with this report?

MR. FENSTERMAKER: I move it be received and placed on file with the rest of the proceedings of the Board.

This motion having been properly seconded, and the question put, it was agreed to.

The CHAIRMAN: I notice Prof. Menges has come in. Has he a report to offer?

PROF. MENGES: I have just come from a Farmers' Institute, and have not got the report in shape to offer at this time. If I get a chance some other time during the session, I will do it.

The CHAIRMAN: Is Dr. Pearson in the room?

Dr. Pearson did not appear to be in the room at the time.

The CHAIRMAN: Is Dr. Patrick here?

Dr. Patrick did not appear to be present.

The CHAIRMAN: Has Mr. Piatt come in, or has he sent in any report?

Neither Mr. Piatt nor his report seemed to have come in.

The CHAIRMAN: We will next have the pleasure of listening to Mr. Heyburn on "The Age in Which We Live."

Mr. Heyburn's paper is as follows:

## THE AGE IN WHICH WE LIVE.

BY R. M. HEYBURN, *Ward, Pa*

In presenting this subject, the age in which we live, I am remindful of the fact that it is a scientific as well as a practical age as it applies to agriculture. Now and then we see a farmer who speaks of the slavery of farm life; true, he has a share of burdens to bear; so have men in other vocations of life. The farmer's life is just exactly what he makes it. Many very excellent people whose characters are noble pass many an hour of sadness and weariness of heart looking for trouble that never comes. The fault is not their circumstances, nor with their general character, but with themselves. Many of the young men on the farm scan the pages of daily papers looking for a job in the city, as they want to be something better than a farmer. Yet it is not likely that talents of all young men need be hidden under a bushel by settling on a farm, for there are plenty of opportunities in all walks of life. The farmer of to-day must let his light shine before men that they may realize bad or good work, for this honorable calling, so considered by Washington, requires men of the best intelligence and enterprise, men of integrity and backbone, able to run their farms in an intelligent manner and on business principles, and take their position with honor in the social and commercial world. Many farmers attain success through much quiet home study, by reading the best agriculture literature, and journeying by the slow but sure road to experience. They are thoughtful and intelligent. Every farmer wants to make money, he wants to make it at the smallest outlay of labor and money. By beginning carefully and moderately every farmer will seek his particular station; he can later attain the more supreme stage of business, should his judgment lead him in that direction. Farming is a great science and in no better way can a young man make his influence felt among his peers, or tone his life work to the spirit of the time than on the farm. Whether on the farm, in the factory, store, school, or elsewhere, the person who thinks, works and sticks to it will come to the front, combined with the scientific teachings of to-day. The farmer's occupation stands without a rival. How many men, successful in other lines of work, grow tired of the strenuous city life, and gladly return to end their days, having proved there is nothing better than a farm life.

The farmers who to-day are accomplishing the best results in their work, and at the same time getting the most satisfaction out of it, are those who not only make a first-hand study out of the conditions which they find on their own farms, but take advantage of every helpful hint and suggestion which they can get hold of coming from their State Agricultural College and Experiment Station. A German authority on social and economical problems has recently issued a statement in which he declares that the professional vocations, medicine, law and teaching, are already overflowing, and advises German young men to fit themselves for careers in scientific agriculture. While conditions in the old countries of Europe do not correspond in all respects with those that prevail in the United States, it is becoming more apparent every day that the professions above referred to are already full in this country; thousands of professional men in cities, large and small, all over the country receiving barely enough to make both ends meet. On the other hand, the agricultural colleges of the country do not begin to turn out men fast enough to supply the demand for experts in the science of animal husbandry, farm crops, soils and dairying. The greatest material problem of the coming years is going to be the feeding of an ever-increasing population, and the young man who fits himself thoroughly along any or several of the above special lines, with a view to supply this great need is sure to have a job waiting for him when he is qualified to handle it. There is certainly a great future for young men of this type. This world needs workers and thinkers, not shirkers. This is just as true on the farms as it is in the halls where laws are made for the nation. We hear a great deal in these days about abandoned farms of the country. There are no doubt a good many places where the light has gone out of the window, there is no fire on the hearth, the buildings are tumbling down, things are at a standstill and the wise men have done a great deal of speculating over the matter. Some think we need to discover some new way of making these deserted farms more productive. No doubt it is alright to make farms produce all there is in them, and the farmer that does not try to do this will never be a success at farming. After bountiful crops have been raised the most important problem that confronts us is the proper marketing of such crops. If there is a defect in the education of the American farmer it is his lack of sufficient training on the purely commercial side. There is an old proverb to the effect that a crop well grown is half sold, but in our day the best-grown crops may bring a poor price if the seller is unable to market it advantageously. He must know how to make his products attractive to the eyes of his customers, and above all practice no deception. Reputation is the standard by which a man should be judged; reputation for square dealing once acquired a man has won his greatest laurels, and can command fancy prices for his marketable article. The farmer should study the markets, and his mind should be trained to project itself so that he may forecast values, and he should be self-reliant enough to decide offhand the proper course to pursue. A generation of farmers so trained and possessed of the skill that now goes with agriculture everywhere, will be the power that will regulate the world. I am convinced that the best place to live is in the country, where the surroundings are healthful, the temptations few and the contact with nature and all her workings are elevating and inspiring. Almost all the men in America who have reached great distinction in the various fields of human endeavor have been country-bred. There is practically no limit to the opportunities of men in these days, who have inherited health and moral stamina, and have been brought up in the country, for, from these are to be recruited the great men of the future, the men who will do things and uplift the world by their efforts.

The causes for deserted farms, in many instances, are not on account of not producing good crops, but from a lack of good, gritty men to operate them and not receiving better returns for crops produced. It does not take a wonderfully smart man to pull up stakes and move a way off somewhere. Trains are daily carrying people who are looking for something better than they use to have. Many of these same men, if you meet them a few years from now, you will find them still on the move; their time is spent in moving. We have all known young men left well off with good farms and money beside, who should be the happiest men in the world. The trouble often is they think the farm will always stay good, money never run out. About the next thing he does is to buy a horse fast enough that he won't have to take his neighbor's dust. This man never knew how to work, neither did he want to, while time rolls on, money gets short, the farm gets poor. No fault of the farm; these are simply cases of taking life easy, while their best days are passing away. Then they say farming don't pay. It is generally the fault of the man. Sometimes existing conditions are hard to remove; difficulties are but opportunities to test our ability. There is great power and effectiveness in wisely-considered organization in everything. We can see it to-day in public affairs. See how powerful the great Trusts have become through far-reaching organization. Organization means simply the best arrangement of knowledge and energy to carry out some given purpose.

Every efficient man needs to have a well-organized mind for his business. He needs, in the first place, abundant knowledge of all the forces he is dealing with; second, he needs to have that knowledge arranged in practical shape so he can go at it and use it at once when needed; then he needs energy and skill to carry out that knowledge. Take the dairy farmer. What is he dealing with? He is dealing first with the soil. He needs thorough knowledge of soils, how to handle them and improve them. He should study the best thought and knowledge of the wisest men who have written on the subject. He should know something of the nature, construction and chemistry of the soil so that when he reads on this subject he can understand the terms used. How fortunate it would have been for the present generation of farmers if they had been taught in their youth, in the country school, the meaning of the terms "Agricultural Chemistry" the same as they were taught the meaning of the terms used in arithmetic. Besides the soil, the dairy farmer is dealing constantly with animal life of his farm; he needs sound knowledge of the physiology of that life to care for feed, and manage it so it shall be carried to its highest degree of efficiency. Then there are questions of fertilizers for soil, of wise feeding for this, that or other purposes, and many other questions that pertain to this life on the farm. Then he needs a knowledge of how to organize the farm itself, so that it shall be in harmony with the great purpose of dairy farming. All this must start in the mind of the farmer himself. If he has a stock of well-stored, well-organized knowledge, if he knows what needs to be done and how to do it, how to arrange forces for final accomplishment, then we have the dairy farm full of the meaning for its final purpose. On such a farm there is ample opportunity for any man to exercise the very highest power, the finest training of mind and hand, the deepest scientific knowledge, and the best of executive ability. What is needed on the American farm to-day is a man who believes all this. Farmers talk of lack of capital. What they need most is this larger, truer comprehension of the meaning of the problems they are dealing with. Once this is understood, then order, organization, efficiency follow, and wealth ensues. No farmer can secure wealth without a well-organized mind, and business without these qualities, if a man had capital it would be wasted, as has been done in thousands of instances. As this applies to the dairy, so it does through all the various channels of agriculture. When the farmers of the present age once become educated in modern principles of agriculture, together with a determination to succeed, they have a bright future.

One of the most serious problems that confront us to-day is the lack of competent farm hands, with all the up-to-date machinery on the farm. The question is still a serious one; particularly is this true when only a few miles from a large city. The problem of the hired man faces us with a persistence which demands attention. Little use to inquire what is the cause of this dearth of farm help. High prices are offered, fair treatment is assured, still the farm work drags for lack of the hired man; and there is a disposition to shirk the work on the farm and cling to city life with its uncertainties, and the struggle goes on. The farmer needs the help of the man in the city; the man in the city needs the work to be had outside; still the two are far apart. The farmer wears himself out in the endeavor to keep the farm up to his ideal, and perhaps at last rents the place and moves away. The farm runs down, and finally the shutters are put up, another light has gone out. The work of educating the young men to come back to the farms is going on, however, and it will not be long before we shall have growing up about us an army of strong-limbed, intelligent young farmers. It is all right that these should go away for an education; they cannot know too much; they will be better farmers for their knowledge of books. And the wise farmer who has a son inclined to make farming a business cannot do better than to make that son such an offer as will decide him what is the best thing to do. That will solve the problem for two men and their families at least. Let us hope we have seen our worse times to secure competent help on the farm.

Not only is this true of the farm, but help within the household is just as difficult to get help. In many cases the overworked wife and daughters are compelled to assist with outside work in order that the most important work may be accomplished. The European governments which are being drained of their young and best workers to supply the demand of the labor markets in America are beginning to view with alarm the situation, and efforts will be made to stay the tide of emigration by the improvement of home conditions.

These efforts, if they are made with any determination and concert, must invariably complicate the labor problem in this country and add to the trials of farmers, who in many sections, are facing the help question with a good deal of discouragement, and will make it more imperative for the farmers' sons to remain at home. Some people think it better to have smaller farms. On the economic side is to be credited the greater personal attention that can be given to each acre, animal and process, and better work than can be given on large estates through hired labor, less destruction of tools, less waste and distance to work. A farm of one hundred acres is 127 rods square, and one of three hundred acres is 220 rods square. The average distance to the field work of one is 73 per cent., or 23 rods less than to the other, and 2 per cent. so far as crop work is involved. If one's normal working powers are used in travel on the large farms it is not destructive, but would be important on 1,000 acres. Large farms invite genius, men of great organizing and administrative powers, and make possible a high order of culture and living. There is now no obstacle in the way of men of this class applying their talents to land, nor no valid opposing reason. Present conditions invite captains of industry to marshal their forces over the green fields and furrowed grounds. Machinery, the genius of the times, compells or demands breadth of action for economy of operation. The trouble of the small farm outside of gardening and fruit growing is that the limit of its income is below the demand of living in the Twentieth Century. I have a friend 15 miles from market growing staple crops only; he is one of the best of farmers and his gross income is $75 to $80 per acre. His profits per acre are large, yet though a man of moderate expenses, of good habits, industrious, able, he has little or no income of family expenses. He has ambition and capacity for larger operation. On some farms 35 acres of actual tillage area will cover the amount found on many farms of 100 to 150 acres, the remainder of the farm returns but a mere nominal, almost negligible income, say $20 per acre net; 35 acres is but $700, and can leave but little after taking out the essentials for living in our times. One hundred acres at the same rate would net $2,000, a respectable sum, even though the profit per acre is reduced to $15, because of reduced efficiency under broad farming, and the result is but $1,500. There is something for the higher life left. In these times the man with 100 acres will have less trouble in keeping help than where there is only one; the more men you keep the easier it is to get help.

One great trouble with the farmers in these days is, they do not understand the terms or words used by writers when discussing farm subjects, such words as "leguminous plants," "balanced rations," "inoculation," "humus material," etc. Many farmers have a wrong notion about these terms. They think they could be expressed in plain, simple language. Such words are mainly used in Agricultural Chemistry, and there are no other words equivalent to them. It is the same with the words "telegraph or telephone." Both are Greek words, and there are no other words that stand for the same meaning. Farmers as well as other classes found no difficulty in learning the meaning of those two words, and they use them readily. It is so with the terms in agricultural literature. We acknowledge that the farmer can not get the true meaning of any article unless he can understand the meaning of the language it is written in. But the true logic of that situation is that the farmer should at once learn the meaning of such words in order that he may gain the knowledge they convey. Right there comes in the great advantage of studying these questions and terms in the common school when young. Where will he be in after life unless he learns their meaning? Thousands of good men to-day can not read their farm paper as intelligently as they wish, just because in their country district school, when boys, they were given no education in these things. All thought, experience, knowledge, is conveyed from one man to another by the use of language. If we can not understand the language we derive no instruction from it. It is a dead language to us. There is no reason why he can not educate himself the same as thousands of others have. By the aid of a dictionary he can learn the meaning of any term used in books or papers. Think how much more of a man he will feel himself to be, and how much more of a man he really is, if he can readily understand the meaning of the articles that are written for his enlightenment. It is a good plan whenever a Farmers' Institute is announced in a neighborhood, for those who expect to attend to save up the knotty problems they encounter in their reading and experience and propound them for solution to the Department's representatives. This would not only make the institute more interesting and instructive, but would also put the lecturer on his mettle and compel him to be of the class that knows he knows. As common people we are surrounded on every hand with the thought, the work, the results of science to the final meaning of our civilization is applied science. It is applied in the buildings we live in, the food we eat, the clothes we wear, etc. Indeed, it is the essence of the life we live. Why, then, should the farmer be so afraid of science or scientific men? Why should he have a prejudice against them? Every improvement that has come to him through life has been brought out through science, and yet there are thousands of farmers who sneer at science and scientific farming. (Science is the organization of the common knowledge of the common people.) A farm is a common thing, but a well-organized, thoroughly efficient farm is very uncommon, and so, there are many men on farms who know enough if they would arrange their knowledge into practical, workable shape, they would prove a success. To know, and to know what we can do with what we know, this is science. Is there any reason why the farmer should be prejudiced against it?

## THE FARMER AS A CITIZEN.

With the broadening outlook of the farmer consequent upon the improvement in agricultural methods, and this improvement has been greater than we art apt to think until we go back a way in history and compare the present with the past, he is becoming more and more interested in the things that relate to government, national, state and local. Becoming more and more a factor in public affairs, a bigger man and a better citizen. This is as it should be. Too long has the man on the farm been willing that the lawyers and the business men should run affairs of state; too long has he been content to take his economic and political ideas at second hand, with the inevitable result that when false principles were advocated and adopted he was powerless to assert himself and demand a better order of things. The result is that we have fastened upon the country a system that makes it possible for the combines in the city to fix such low prices upon the products of the farm as to render the loss of the farmer frequent, while they fix the price of the same article to the consumer at a figure so high as to discourage consumption. Viewed from no higher standpoint and his own financial welfare, therefore, the farmer finds it necessary that he shall take his full share of the responsibilities of citizenship, and develops a mental grasp and a resource in information that will enable to command the attention and respect of his fellow-citizens in every walk of life. The agricultural college and the farmers' institute are doing great things for the farmer in this direction, and it is gratifying to note how rapidly are coming into public notice men from the farms who are distinguishing themselves by their ability to discuss with largeness of view the important questions of the day. When the American farmer takes his rightful place in the affairs of the country there will be less to complain of in government, and justice will be its dominating principle.

During the reading of this paper, Mr. Hutchison, the second Vice-President, took the Chair.

The CHAIRMAN: What is the pleasure of the Board regarding this paper?

MR. McCREARY: I move that it be received, and incorporated in the proceedings.

This motion was properly seconded, and the question having been put, was agreed to.

The CHAIRMAN: Is Dr. Pearson in the room? It appears that he is; we will therefore now have the pleasure of listening to Dr. Leonard Pearson, the State Veterinarian:

## REPORT OF VETERINARIAN.

By Dr. Leonard Pearson.

I have to report to you as Veterinarian of the State Board of Agriculture in regard to the health of the animals in the last year, and the work of the Veterinary Sanitary Division of the State Board of Agriculture. The work of this Division has been directed against tuberculosis, as has been the case in all previous years. It is not that other diseases do not exist, or that we do not care, but tuberculosis prevailed so largely, and made such inroads on the livestock throughout the State, that the State Board of Agriculture felt called upon to devote its energies to fighting this disease more than any other. Nor is it that tuberculosis is becoming more prevalent; it is becoming less prevalent in Pennsylvania, decidedly so. This is due to the increased desire on the part of owners of herds to free their herds from this disease, and this is but the expression of a great movement that is sweeping across the State, across the country, and I might add, across the world, against tuberculosis. This disease has increased until it has come to be the chief cause of mortality among animals and men, and more destructive than small-pox and the Bubonic plague and cholera, and all the other plagues combined.

Now, the movement that is being introduced against this disease is destined to become one of the great historic movements. The people have become aroused to the question. These historic movements sweep across the country at intervals; sometimes they are economical movements, sometimes great religious movements, sometimes movements relating to the physical or moral health of the community. You know it was the great movement against slavery that divided the country into two armed camps; then it was the great temperance movement that aroused the nation; now it is the great movement against tuberculosis, and I believe that it will exterminate this disease. In past years small-pox and leprosy and other dread diseases have been exterminated by just such popular movements, and I believe it will be the same with tuberculosis. Of course, this will not come at once. It will take years, but a great International Tuberculosis Congress is to meet at Washington next September. It is believed that this will be the largest meeting that has ever been held regarding this disease. It is not a medical meeting, but it will be participated in by people of all nations who are interested in the subject, and it is expected that there will be two thousand delegates from foreign countries. I mention this to show the force of this movement against tuberculosis, and I say it is bound to be successful, but not immediately. The Department of Agriculture in New York State has at last aroused itself, after many years' slumber, to the great question of tuberculosis among cattle. They have made examinations in various parts of the state, and have come to the conclusion that about 20 per cent. of the cows in New York State are tubercular. From what I have seen, I should say that this is about correct, and as they have 1,800,000 cows in the State of New York, it would follow that approximately 400,000 are tubercular, and yet one of the members of the Department of Agriculture in that state—the Deputy Secretary—

MR. HUTCHISON: Was it Flanders?

DR. PEARSON: Yes; it was Flanders—told me that they expect to be able to control it in three months. Why, the cost of exterminating that disease in that number of cattle would approximate $20,000,000, the entire revenue of the state for a year. This shows that they don't know what they are taking hold of. We have been at the work since 1896, and tuberculosis has steadily declined; we have, I should say, one-third less of tuberculosis than is supposed to exist in the State of New York, and the expenditures have not averaged over $35,000. It is more this year, because the Livestock Sanitary Board has other lines to carry out, but we have expended less than $400,000 since the work started a little over eleven years ago. When you take into consideration that there are over 2,000,000 cattle in Pennsylvania, you will find that this appropriation of $35,000 is somewhat less than two cents a head for each bovine animal in the State. That is a very cheap insurance, I think, and from results, we may be justified in congratulating ourselves, I should say. At any rate, other states are now interested in the character of the work that is being done in Pennsylvania against tuberculosis, and they are continually making inquiry with a view to taking up the work on similar lines.

I don't know that it is necessary to say anything about the present plans for the work against tuberculosis; they are all known to you. As you know, it is largely a matter of co-operation between the owners of infected herds and the State Livestock Sanitary Board. The chief objection we have is that we cannot make the examinations rapidly enough—as rapidly as the owners would like. Where we cannot make an examination, we frequently advise. The advice is free, and a good deal is accomplished in that way.

There is another disease, glanders in horses, that has proven rather destructive in large cities, particularly Philadelphia and Pittsburg, and in other parts of the State, where there is importation of horses from other states. It seems that there is more glanders than usual in the state where we get our horse supply, and the high price of horses has tempted the importation of infected horses under circumstances which would otherwise not have occurred. We have found it, for instance, in shipments of mules from East St. Louis particularly to the mines, and in some cases they contracted the disease before we knew it. There is a law against the importation of such animals, and there is now a penalty for the hiding of this disease, so we are getting closer to it.

Rabies is another disease that requires attention. There are now several districts in the State where the dogs are under quarantine by the State Board for rabies. There have been a number of deaths of children, to say nothing of cattle and horses. There are too many dogs in Pennsylvania, as I am sure you will all agree. The matter of taxation of dogs has been a very important one, and as you know, through the efforts of the Department of Agriculture, a bill was passed last year requiring the licensing of all dogs, and requiring the County Commissioners to furnish a tag bearing the name of the owner, to be attached to the dog, and requiring the shooting of dogs that have no such tags; but in some parts of the State this law has been deliberately ignored, so that we might just as well not have any law, so far as results are concerned.

Hog cholera practically does not exist in Pennsylvania except where hogs are brought in from other states, and in this case the hogs are at once placed under quarantine, so that we have but little trouble with this disease.

Just a word as to one or two new diseases, or rather as to one old disease, and one new disease that we have recently discovered: It is called Epizootic Larynphangitis. When it was told the Governor that this disease had appeared in Pennsylvania, he said, "My gracious! but that must be a terrible disease," and as a matter of fact it is. It is caused by yeast that has the organism of the vegetable parasite of yeast; it starts in the larynx and spreads to other parts of the body through the lymphatic glands. It may be cured, however. This disease appeared in Beaver and Jefferson counties last fall. It had never before appeared in North America. It has been known in the Philippine Islands and in South America. It was carried to South Africa during the Boer War, and from there carried into England and Ireland, but how it came into North America, or into Pennsylvania, we don't know. The diagnosis is there, but where the disease came from, we don't know. The supposition, however, is that it existed for a long time without being known, and that outbreaks of it have occurred in other states. It exists now in New York and Ohio, and we have about one hundred and seventy-five cases of it under quarantine.

Now, the other disease that is not new is the dysentery occurring in cattle. It has existed in the State for quite a long while, but until recently, it was not discovered. It has existed in Europe for many years, but we did not discover it until last year. It is caused by a bacillus that in some respects rather resembles the germ of tuberculosis and in other respects differs widely from it. It occurs in the lining of the large intestines. The effect of it is that it causes dysentery, and brings about a decline in the general condition of the animal. The animal becomes weak and aenemic, and is likely to die. Now, since we know that it has appeared, we are making every effort to control it; it exists in Chester county, and in the parts of Bucks, Berks and Northampton. If it exists in other parts of the State we are not aware of it.

MR. RODGERS: Where is the seat of the glanders?

DR. PEARSON: It usually starts in the lungs, and from there it spreads. A horse may have glanders of the lungs for a long time before he shows it, but finally there is an irritation of the nose, and then the eyes.

MR. RODGERS: What is the difference between glanders and tuberculosis?

DR. PEARSON: Pathologically the diseases are very closely related, but the inoculation of the one will produce that disease, and the inoculation of tuberculosis will produce it.

A Member: Is glanders transferable to man?

DR. PEARSON: Yes, it is.

A Member: More so than tuberculosis?

DR. PEARSON: Not necessarily so; the possibilities are about equal.

MR. FENSTERMAKER: The effect to stamp out tuberculosis is not quite as strong as it should be in our section. Several things point to prevent the people from it; the uncertainty as to whether they will get the $25 for a head of cattle, and the fact that it has been rumored that there are people who make a practice of bringing in cattle from the West and then having it condemned by the State Inspector for the purpose of securing the $25 a head. I don't know whether this is true, or not, but if it is, it certainly should be looked into.

DR. PEARSON: If such an impression exists in your neighborhood, it is a most erroneous one. As a matter of fact, no animals are paid for unless they are in the State four months; no dealer can buy infected cattle and bring them into the State, and then get paid for them; they must be certified to as having been in the State four months, and that they were free from infection when they were brought here.

MR. WALTER: How long does it take before the animal dies after it is taken with tuberculosis?

DR. PEARSON: The question is, how long will the animal live after it becomes infected with tuberculosis. Well, there is no answering that, because it is so variable. In some animals it runs a very rapid course, and in some a very long course. It is just the same with man. A man may have consumption for two weeks, and die of it—galloping consumption—or he may have it for forty years. So it is with animals. Sometimes they have it for a long time. The Department of Agriculture has recently published a pamphlet, giving the case of an animal on their farm, which was known to have tuberculosis for seven years, and kept in good condition, but the examination showed that this animal was constantly expectorating tuberculosis matter and spreading the disease.

MR. GOODERHAM: You spoke of these diseases of the horses. Now, there were some horses brought into Clearfield county, in the neighborhood of Blandsburg, near Jefferson county, which were afflicted with some disease. They became weak, there was a considerable amount of cough, and their legs were swollen, and I said "this is some new disease."

DR. PEARSON: I will take the names and addresses of the owners of these horses and look into the matter locally. I will get these addresses from your personally, and if any one else knows of any disease existing among horses in their section, I shall be glad to have them tell me of it, so that I may look into it.

MR. GOODERHAM: I thought it best to call attention to this, although it may only be a case of distemper.

DR. PEARSON: It may be a case of Epizootic Larinphrangitis.

MR. SCHWARZ: I move we take a recess of five minutes.

This motion was properly seconded, and the question having been put, agreed to.

A recess of five minutes was then taken, at the expiration of which the meeting was again called to order by the Chairman.

The CHAIRMAN: The Secretary will again call the roll by counties, to give delinquent members a chance to respond to their names.

The Secretary thereupon called the roll, the answers to which are included in the list of members present.

The CHAIRMAN: Mr. Thomas has just now informed me that he has received his credentials from the Governor. I think these had better be passed over to the Committee on Credentials, and have them make a report on it.

MR. GLOVER: The Executive Committee will please meet me in the Deputy Secretary's Room. Will the Secretary please read the names of the members of the Executive Committee?

The Secretary read the names of the Committee.

The CHAIRMAN: I hope this Committee will not go out just at this time, because we have with us a former Secretary of Agriculture, from whom we will now hear, and I would like every member to be present while he addresses us.

DR. PEARSON: I merely want to say that if there is any one here who is under the impression that the State Livestock Sanitary Board has paid out money that should not have been paid out—that is, for cattle imported into the State, if they will tell me about it, I will give them a statement of the cases so far as we have them on our records, and then, if they find that the statement is not correct, I shall be very glad, indeed, to show them the actual reports on each animal. We have three reports on each animal that is paid for by the State—the inspection report, the appraisement report, and the post-morten report. The appraisement report is signed by both the inspector and the owner of the animal, and the history of the animal is given so far as it is known. These records are on file on the third floor of this building, and we have on file there the records of every animal that has been paid for by this State.

The CHAIRMAN: I am glad to have Dr. Pearson make this statement. When the first animal was killed under this law, I went with the Doctor over on the Island; the man wanted $20 and the Doctor was only going to allow him $15, and he argued with that man until I got tired; so tired that I would gladly have given something out of my pocket toward paying for that cow, to stop the argument. Of course, I saw the point the Doctor was making. That animal was worth nothing to the man; it was a detriment to his herd, and he was really in pocket the fifteen dollars, but he would not see it in that light.

The SECRETARY: He took you along to shoot the animal.

The CHAIRMAN: Well, no; I went down behind the barn while the Doctor hit it on the head with a sledge. I never could bear to see anything killed.

We will now listen to an address by Prof. Hamilton on "A Better Agriculture, and How to Get It." It gives me great pleasure to introduce Prof. Hamilton.

**PROF. HAMILTON:** Mr. President, and Members of the Board: When Secretary Critchfield asked me to prepare a paper for this meeting, I was very glad to accept the invitation. There are several things I have wanted to say for some time, and I wanted to say them at home, here among the people who know me, and whom I know. I thought it might interest you to know respective to some of the things we have accomplished in this country in the last forty years along the lines of increased production, and have attempted to discuss this question under the title of

## A BETTER AGRICULTURE AND HOW TO GET IT.

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BY JOHN HAMILTON, *Farmers' Institute Specialist, United States Department of Agriculture.*

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The crop yield of the United States has reached enormous proportions. The recent report of the Secretary of Agriculture, in speaking of cereals, announces that in the year 1907 the corn crop was 2,553,732,000 bushels; the wheat crop, 625,576,000 bushels; oats, 741,521,000 bushels; barley, 147,192,000 bushels; rye, 31,566,000 bushels; rice, 21,412,000 bushels, and buckwheat, 13,911,000 bushels. The farm value of the cereals for the year is estimated at $2,378,000. Added to the cereal crops are hay, cotton, sugar and tobacco, and the enormous income from the dairy, poultry and livestock interests, making a grand total of addition to the national wealth from agriculture alone of $7,412,000,000. These figures represent quantities of produce and an income of wealth altogether beyond our comprehension.

In the face of such figures how is it possible to justify the expenditure of millions of money, and the employment of thousands of skilled experts to secure a better agriculture, to improve that which has already grown to dimensions beyond our ability to comprehend?

Upon the proceeds of agriculture about 35 per cent. of our population are dependent for their living. Before, however, the products of the year can be enjoyed there must first be expended vast sums for rent of land and buildings, implements, labor, fertilizers, taxes and other expenses. Whatever is left is then available for the maintenance of the agricultural population, and for addition to their accumulation of surplus wealth. Accordingly, the aggregate income of a nation, or an individual is not of itself conclusive evidence of unbounded prosperity. The cost may be greater than the income, and the individual be left at the end of the year worse off than at its beginning.

I have thought that it might be interesting and perhaps instructive to take some of the items of our production and analyze them with a view to discovering their precise status as contributors to the general prosperity of the country and to the wealth of farming people. In dealing with the great problems of agriculture it is necessary to follow to some extent the methods of the chemical analyst and deal with units or small areas. The chemist in undertaking to discover the truth respecting the composition of a substance does not analyze the entire mass, but selects a sample, and divides and sub-divides it until but a small quantity is finally selected, and with this he conducts his investigation. The individual farmer and the land that he tills correspond in this instance to the chemist's sample. The various operations, crops, animals and soils with which he deals are the component parts which exhibit the true condition of the business. The abundance, average condition, cost of production and degree of perfection of the product show at least approximately, the condition and profitableness of the industry as a whole.

## WHEAT PRODUCTION.

Perhaps no single crop is grown more universally throughout the United States than wheat. From the northernmost States to the Gulf, and from the Atlantic Coast to the Pacific, every State in the Union reports a greater or less acreage of this cereal. Inasmuch as quite accurate data extending back through many years are at hand respecting the products of this crop, it is possible to ascertain with considerable accuracy and definiteness the actual conditions under which it is produced.

In the past ten years the annual wheat crop of the United States ranged from 522,229,505 to 735,260,970 bushels. The average annual production, however, for the ten years from 1897 to 1906, was 631,181,626 bushels. The average yield per acre in the United States for the decade 1897 to 1906 as given by the report of the Department of Agriculture for 1906 was 13.8 bushels, and the average annual yield from 1871 to 1906 was 12.69 bushels per acre. The averages per acre according to periods were as follows: 1871 to 1876, 11.70 bushels; 1877 to 1886, 12.51 bushels; 1887 to 1896, 12.66 bushels; 1897 to 1906, 13.82 bushels, and the average for the entire period from 1871 to 1906 was 12.69 bushels. The annual average value of the crop for the decade, 1897 to 1906, was $9.48, and for the entire thirty-six years from 1871 to 1906, $10.28 per acre.*

## COST OF AN ACRE OF WHEAT.

When it is remembered that the cost of production of an acre of wheat in the Eastern part of the United States is about $12.50 but little argument is needed to show its status in the list of profitable crops in that section. While the cost of producing an acre of wheat upon the new lands of the great West, where wheat is grown as practically the only crop, is at present much less than in the older wheat districts of the East, nevertheless the fact that the entire wheat acreage of the country averaged but $9.48 per acre for the last decade, shows that the margin of profit even under the most favorable conditions is comparatively small.

That wheat is not an exception to other cereal crops in its value per acre is seen by the Census report for 1899, which gives the average value of all of the cereals taken together at but $8.02 per acre. When it is remembered that of the acreage of all farm crops in 1899, 63.8 per cent. were cereals, we can understand how vitally this low production affects the farming interests of the country.

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*Report of Department of Agriculture, 1906.

While it is true that some farmers receive much greater income per acre from their cereals than the average indicates, yet an equal number receive correspondingly less, so that taking the country as a whole the average remuneration to the portion of the 35 per cent. of our population who grow cereal crops must from this source of necessity be very slight.

### CONSUMPTION OF WHEAT.

The records show that our population consume from four to seven bushels of wheat per capita each year, depending upon the price, and the condition of the business of the country. The average consumption of wheat, however, taking all of the years between 1871 and 1906, was 5.25 bushels per capita per year. The average production of wheat during that same period was 7.31 bushels per capita, leaving 2.06 bushels as surplus, which is an average of 28.2 per cent. The actual exports for the period from 1871 to 1907 as given in the statistical abstract for 1906 were: From 1871 to 1876, 23.78 per cent. of the crop; 1877 to 1886, 29.94 per cent.; 1887 to 1896, 29.92 per cent.; 1897 to 1906, 28.58 per cent., and the average for the entire period was 28.05 per cent. It will be observed that the average pro rata for export for each period was practically uniform, although the population of the country had increased in that time from 39,555,000 to 84,154,000, or 112.75 per cent.

### INCREASED ACREAGE IN WHEAT.

This is due to the fact that the acreage of wheat in the United States as given by the report of the Department of Agriculture in 1906 increased 137.19 per cent., from 19,943,893 acres in 1871, to 47,305,829 acres in 1906, or 24.44 per cent. greater than the population. In other words, it required in 36 years 27,361,936 additional acres to be put out in wheat in order to supply our increasing population and keep up the average per cent. of our export trade.

It is manifest that such an additional acreage cannot be expected in the next 36 years, for the great body of available wheat lands in the United States has been appropriated. The time will therefore come when at the present rate of production per acre our population will overtake our wheat production. As has been shown, wheat production by increasing the acreage each year, has succeeded in holding its relative position as respects population during the past 36 years, the average production per capita varying only slightly in any decade. The average production from 1871 to 1876 was 6.28 bushels per capita; from 1877 to 1886, 8.06 bushels; 1887 to 1896, 7.25 bushels; 1897 to 1906, 7.66 bushels, being a per capita average for the entire period of 7.31 bushels. During the same time the surplus for export has only varied from a minimum average of 23.78 per cent. of the crop in the six years ended 1876, to a maximum of 29.94 per cent. for the decade ended 1886 with an average for the entire period from 1871 to 1906 of 28.05 per cent.

### RELATION OF WHEAT PRODUCTS TO GROWTH OF POPULATION.

If the present wheat acreage were to stand still, and the bushels per acre now grown remain constant, allowing 5.25 bushels to the individual per year, and estimating our annual crop at 631,181,626 bushels, which is the average for the past ten years, a population of 120,225,071 would consume our entire production annually. At the present rate of increase this point of complete consumption would be reached inside of 15 years.

Mr. James J. Hill, in an address delivered at the dedication of the Livestock Pavilion on the Minnesota State Fair Grounds, September 3, 1907, presented some figures respecting the increase of our population in the next 40 years that are worthy of serious attention. I quote from his address the portion relating to this point. Mr. Hill says:

> "So careful an observer as Leroy Beaulieu gives the natural increase of our population as 15.2 per thousand per year. It is fair, therefore, to reckon the increase by the excess of births over deaths at 15 per cent. on the average for each decade. The additions by immigration are more variable. It is highly probable, however, that the oncoming tide will increase. Only in periods of severe depression has immigration fallen much below the half million mark for the last twenty-five years. In good or fairly good times it has gone greatly above. In the two years before 1905 it exceeded 800,000 annually, while for each of the last two years it has exceeded one million. It is a conservative estimate, therefore, to add 750,000 a year for increase of population from this source, or 7,500,000 for each decade. Computed on this basis, the population of the United States in the near future will show these totals: Population in 1910, 95,248,895; population in 1920, 117,036,229; population in 1930, 142,091,663; population in 1940, 170,091,663; population in 1950, 204,041,223."

If Mr. Hill's estimate is correct, or even approximately correct, and our population increases by the middle of this century to 204,000,000, we will need 1,071,000,000 bushels of wheat at 5.25 bushels per capita to feed our people. To produce this at 13.5 bushels per acre would require 79,259,185 acres, or 31,953,356 additional acres over that in wheat in 1906, or 67.54 per cent. addition to our present acreage. Can this increase be secured?

## DIVERSIFIED FARMING.

It is very clear that the states whose agriculture is now devoted almost exclusively to growing wheat must in the near future follow diversified farming, so that instead of increasing, they will have to restrict the percentage of their wheat area as has been found necessary in all of the Eastern States. This they will be compelled to do in order that the fertility of their soils may be maintained that they may produce sufficient crops to justify their tillage. To put out on any large scale more than one-third of the land adapted to cereal crops in wheat is practically impossible in any system of agriculture that is to continue.

The census of 1900 shows that the per cent. of acres in wheat as compared with the entire cereal crop is at present less than one third. The total land in cereals, barley, buckwheat, corn, oats, rye, wheat, rice and kaffir corn in 1900 in the United States was 184,994,588 acres.

In 1880 the proportion of acreage in wheat to the entire cereal crop was 29.8 per cent.; in 1890, it was 23.9 per cent.; in 1900, it was 28.4 per cent., an average for the three decades of 27.4 per cent., or 6 per cent. less than one-third. This is significant in that this average prevails notwithstanding the fact that the great wheat States of Arizona, California, Colorado, Idaho, Minnesota, Nevada, North Dakota, Oklahoma, Oregon, South Dakota, Utah and Washington had an average of 64.4 per cent. of acreage of cereal crops in wheat. These states have doubtless almost, or altogether, reached their maximum acreage in wheat, and will gradually reduce their area of this crop in future years. Ten states, California, Illinois, Indiana, Iowa, Kansas, Michigan, Minnesota, Nebraska, New Mexico and Wisconsin, have already begun such reduction. In 1880 the percentage of acreage in wheat to the entire cereal crop in these ten states was 45.1. In 1900 this had been reduced to 32 per cent., a difference of 13.1. This same change will undoubtedly occur in all of the other great wheat producing states inside of the next three decades as the ranch system gives place to the smaller farm.

If, however, no reduction occurs and not only the present average of 27.4 per cent. of acreage of cereal crops be put out in wheat, but the area be extended to embrace full 33 1-3 per cent., it would amount to only 61,664,862 acres, or 14,359,033 acres above our present acreage, as reported by the Agricultural Department for 1906.

At the present average rate of production during the last decade, 13.8 bushels per acre, 61,664,862 acres would produce 850,975,095 bushels of wheat per year. This at 5.25 bushels per capita would support 162,090,494 persons, a population which, according to Mr. Hill's estimate, would be reached about 1938, or in 30 years.

## PROVISION FOR THE FUTURE.

What are we doing to anticipate this event? We are endeavoring to extend the wheat area by reclaiming waste lands through irrigation and drainage, and the introduction of varieties adapted to districts where the fall of rain is too small to permit of the growth of the varieties hitherto in use. This is practically a continuation of the policy of extending the area in order to meet future demands. That these methods of extension must sooner or later terminate needs no demonstration.

In addition to this somewhat mechanical method there have been established agricultural colleges, agricultural experiment stations and the national and State Departments of Agriculture, together with the farmers' institutes now organized in every State. These institutions have undertaken to deal with the question of the future supply of food products for the increasing population of our country by scientific methods, through the accumulation and dissemination of information respecting the laws of growth, and the discovery of the principles that underlie profitable production. Notwithstanding the efforts of all of these agencies the average production per acre of the various crops has not been materially increased in the last 36 years. The following data taken from the report of the Department of Agriculture for 1906, and from the census of 1900, exhibit this feature:*

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*Note.—Data from both of the above authorities are given in order that the extent of their differences in estimating crop production may be compared.

Average Production per acre of Five Cereal Crops, 1871 to 1906. Report U. S. Dept. Agriculture, 1906.

| Crop. | 1871 to 1876. | 1877 to 1886. | 1887 to 1896. | 1897 to 1906. | Average 1871 to 1906. |
|---|---|---|---|---|---|
| Wheat, | 11.70 | 12.51 | 12.66 | 13.82 | 12.60 |
| Corn, | 26.68 | 25.06 | 24.05 | 25.40 | 25.30 |
| Rye, | 12.00 | 13.03 | 12.91 | 15.94 | 13.49 |
| Oats, | 27.38 | 27.82 | 25.51 | 30.14 | 27.71 |
| Barley, | 21.35 | 22.41 | 22.72 | 25.53 | 23.00 |

Average Production per acre of Five Cereal Crops, 1879 ta 1889. Census of 1900.

| Crop. | 1879. | 1889. | 1899. | Average. | Difference from Agr. Dept. Rept. |
|---|---|---|---|---|---|
| Wheat, | 13.0 | 13.9 | 12.5 | 13.1 | +.41 |
| Corn, | 28.1 | 29.4 | 28.1 | 28.5 | +3.20 |
| Rye, | 10.8 | 13.1 | 12.4 | 12.1 | —1.48 |
| Oats, | 25.3 | 28.6 | 31.9 | 28.6 | +.89 |
| Barley, | 22.0 | 24.3 | 26.8 | 24.4 | +1.40 |

Value of Yield per Acre of Five Cereal Crops, 1871 to 1906. Report of U. S. Dept. Agriculture, 1906.

| Crop. | 1871 to 1876. | 1877 to 1886. | 1887 to 1896. | 1897 to 1906. | Average 1871 to 1906. |
|---|---|---|---|---|---|
| Wheat, | 11.78 | 11.21 | 8.67 | 9.48 | 10.28 |
| Corn, | 10.96 | 9.90 | 8.58 | 9.75 | 9.70 |
| Rye, | 9.45 | 8.16 | 6.93 | 8.46 | 8.25 |
| Oats, | 9.56 | 8.98 | 7.19 | 9.85 | 8.88 |
| Barley, | 16.20 | 13.60 | 10.40 | 10.76 | 12.74 |

Value of Yield per acre of Five Cereal Crops, 1879 to 1899. U. S. Census 1879, 1889, 1899.

| Crop. | 1879. | 1889. | 1899. | Average. | Difference from Agr. Dept. Rept. |
|---|---|---|---|---|---|
| Wheat, | 14.40 | 9.70 | 7.03 | 10.37 | +.09 |
| Corn, | 10.53 | 8.32 | 8.73 | 9.19 | —.60 |
| Rye, | 7.08 | 5.54 | 5.98 | 6.20 | —2.05 |
| Oats, | 8.37 | 6.55 | 7.35 | 7.42 | —1.46 |
| Barley, | 12.95 | 10.11 | 9.31 | 10.79 | —1.95 |

The failure of our institutions to make a perceptible impression upon the increase in bushels per acre is not due to incapacity in dealing with the lines of work in which they are engaged, but in their insufficient number and inadequate equipment and means of support. For instance, in a State like Pennsylvania what can one institution do in the education of six millions of people in agriculture when its efforts are confined to the students in its class rooms and are limited to a few thousand dollars for equipment and employment of instruction force?

## KNOWLEDGE OF AGRICULTURE MUST BE GENERAL.

It has been found that to secure an intelligent citizenship education must be general. In like manner to secure an efficient agriculture, accurate information respecting it must be put in possession of the masses of farmers, and not be confined to the fraction of less than one ten thousandeth of 1 per cent. who are able to leave home and attend an agricultural college. The instruction, to be effective in increasing crop production, will have to be extended beyond the college walls to the people out at work, and be fitted for their use.

## IMPROVED METHODS OF DISSEMINATION.

If, also, anything like rapid improvement in our agriculture is to be made, it will have to be through a more substantial form of instruction than our present farmers' institutes provide, which meet only a small number of farmers for a day or two each year, and then furnish them only one or two periods of instruction of forty minutes each upon any single topic. If the mass of farmers is to be instructed in the science and mystery of agriculture the information will have to be given in some more effective way than by scattering broadcast bulletins and reports upon agricultural subjects which only the already well-to-do and educated read.

If we are to have a better agricultnre, one that will expand and meet the needs of all of the generations yet to come, we must do more than increase superficial acreage; we must make each acre increase its product as the needs of mankind require. In short, we must extend our acres downward.

## PRODUCTION PER ACRE.

How far this may be done is illustrated by well-authenticated instances of maximum crop production in the United States. Sixty bushels of wheat have been grown per acre; 71 bushels of barley; 254 bushels of shelled corn; 800 bushels of potatoes; 300 bushels of strawberries, and 12 tons of hay. While these are exceptional harvests, yet they illustrate the productive power of an acre of ground, and show the possibilities of agriculture in these several directions.

## PRODUCTION IN FOREIGN COUNTIES.

What can be done and has been done upon a large scale in crop production by the use of proper methods is illustrated by reports from other countries. The following figures giving the average production of wheat, rye, oats, barley and potatoes in America, Belgium, France, Germany, the Netherlands, Sweden, Great Britain and Ireland for the years 1903, 1904 and 1905 compared with the average of these same crops of the United States as given in the census of 1900, show how much further advanced are their methods than those in use in this country. The average of wheat per acre in these eight foreign countries in these years was 28.42 bushels as against 12.5 bushels in the United States; rye, 24.5 as against 12.4; oats, 43.56 as against 31.9; barley, 34.9 as against 26.8; potatoes, 180.23 as against 93 bushels. This shows an average increase per acre in all of these countries above the average production of the United States of 127 per cent. for wheat; 97 per cent. for rye; 35.8 per cent. for oats; 30 per cent. for barley, and 93 per cent. for potatoes.

## HOW SIMILAR INCREASE WOULD AFFECT CROPS IN UNITES STATES.

Such an addition to the crops of the United States would be equivalent to an annual increase in value of these five crops over that reported in the Census of 1900 of $666,483,219, or 90 per cent. If the same percentage were applied to the total crop production of that year in the United States, the increase would amount to $2,619,124,726.

If, however, instead of taking the total averages for the three years in all of the foreign countries alluded to, there are selected from them the averages of only the most productive years, a much higher percentage of increase is shown. The following table shows averages of crops per acre in five foreign countries for selected years compared with the averages of the United States in 1899.

| Crop. | Great Britain. | | Ireland. | | Belgium. | |
|---|---|---|---|---|---|---|
| | Year. | Ave. Bu. | Year. | Ave. Bu. | Year. | Ave. Bu. |
| Wheat, | 1905 | 33.8 | 1905 | 37.8 | 1904 | 35.1 |
| Oats, | .......... | .......... | 1905 | 56.9 | 1903 | 68.5 |
| Rye, | .......... | .......... | 1905 | 27.0 | 1903 | 34.7 |
| Barley, | 1905 | 35.0 | 1905 | 46.4 | 1904 | 50.7 |
| Potatoes, | 1904 | 234.8 | 1905 | 207.2 | 1904 | 244.3 |

| Crop. | Netherlands. | | Germany. | | United States. | |
|---|---|---|---|---|---|---|
| | Year. | Ave. Bu. | Year. | Ave. Bu. | Year. | Ave. Bu. |
| Wheat, | 1904 | 31.1 | .......... | .......... | 1899 | 12.5 |
| Oats, | 1903 | 56.3 | 1903 | 51.2 | 1899 | 31.9 |
| Rye, | .......... | .......... | 1904 | 24.9 | 1899 | 12.4 |
| Barley, | 1903 | 48.5 | 1903 | 36.3 | 1899 | 26.8 |
| Potatoes, | 1904 | 240.7 | 1905 | 216.7 | 1899 | 93.0 |

If the averages therefore are selected from the most productive years of the seven foreign countries, France, Germany, Great Britain, Ireland, Sweden, Belgium and Netherlands out of the three years, 1903, 1904 and 1905, the increase is applied to the five crops in the United States, wheat, oats, rye, barley and poatoes, as reported in the census of 1900, would represent an additional value of $812,253,344, or 109.86 per cent., and if this percentage is applied to the entire crop production of this country it would amount to an increase of $3,197,078,335 over the reported aggregate yield for that year.

## INCREASED PRODUCTION ABROAD DUE TO IMPROVED METHODS OF DISSEMINATION.

This increased average production by foreign countries over the United States is not because of any inherent or naturally superior properties of the soil or climate abroad, but is due to the systematic methods pursued in carrying information respecting improved agricultural operations directly to the farming people.

It is a matter worthy of special note that most of the information given in these countries to farmers is through personal teaching, advice and instruction, and not through bulletins and books. This fact is most significant in that it is a radical departure from the methods pursued in the United States which has thus far depended almost solely in the dissemination of agricultural information upon the printed page, and the slow progress that has been made in agricultural improvement in the United States has no doubt been largely due to the fact that the information that the bulleins, pamphlets and other printed matter contain has not been brought through living, personal teachers directly to the attention of those whom it is specially intended to benefit.

## THE IMPORTANCE OF THE LIVING TEACHER.

The movement, therefore, that looks toward the placing of the living teacher in direct contact with the toiler of the soil through the farmers' institute, the movable school of agriculture, and the itinerant advisory professor, as well as the teaching of agricultural subjects to children in the public schools is in the right direction, and is in conformity with the best practice and most successful results secured after many years of experiment in foreign countries.

## METHOD IN USE IN IRELAND.

Perhaps as conspicuous an example as any of what this method of instruction may do for a country is seen in Ireland, where in 1905, the average production of wheat was 37.8 bushels per acre, and of potatoes 207 bushels per acre. The following extract from the Sixth Annual Report, 1905-06, of the Department of Agriculture and Technical Instruction for Ireland explains in detail the methods that have been adopted in that country for giving instruction in agriculture. The facts are quoted quite fully in order to show the plans used in introducing improved methods of agriculture into the every-day practice of the great mass of Irish farmers.

## ITINERANT INSTRUCTION IN AGRICULTURE IN IRELAND.

"In the year 1905-06 thirty-one County Committees of Agriculture adopted the Department's scheme of itinerant instruction in agriculture, but owing to lack of qualified candidates, only twenty-three instructors were appointed.*

"The main branches of the work of the itinerant instructor in agriculture are the delivery of lectures to farmers at rural centres during the winter months, the carrying out of agricultural experiments and demonstrations, and the visiting of farms for the purpose of giving advice to farmers. During the year under review the instructor delivered 1,169 lectures which were attended by 66,114 persons, the average attendance being about 56. The instructors also superintended the laying down of 2,082 demonstration plots, and instituted 439 experiments on the principal crops. The visits paid to farms reached the total of 8,294, representing an average of 365 for each instructor. As the visits are undertaken only at the request of the farmers concerned, their number affords an index to the place which the instructor fills with reference to the agricultural industry of the county where he is employed. A considerable portion of the instructor's time is occupied in affording advice to farmers by letter, a course which is adopted when a personal inspection of the farm is unnecessary or not feasible at the moment."

## ITINERANT INSTRUCTION IN HORTICULTURE AND BEE-KEEPING.

Twenty-six itinerant instructors were employed by the County Committees in giving instruction in horticulture and bee-keeping.

In each of ten counties the instructor was qualified in horticulture as well as in bee-keeping; in eleven counties the instructors were not qualified in bee-keeping, and gave instruction in horticulture only; in each of four counties two instructors were employed, one being qualified in horticulture only, and one in bee-keeping only; and in one county an instructor in bee-keeping only was available.

The lectures, as in the case of other schemes of itinerant instruction, are usually arranged for the evening, when such subjects as soils, manures, vegetables, fruit and flower cultivation, plant diseases and insect pests are dealt with. The demonstrations are held either at the established plots or in the gardens and orchards, in the districts visited by the instructors, and on these occasions practical lessons are given in pruning, spraying, planting and grafting of fruit trees, vegetable culture, modern bee-keeping, etc.

During the year ended June 30, 1906, 624 lectures were delivered with an average attendance of 57, and 14,994 visits and demonstrations were given.

The establishment of several horticultural demonstration plots throughout a county as examples of proper methods of selection and cultivation of fruits, vegetables and flowers, is regarded as a feature of great educational value in the scheme. At each plot (which it is recommended should not exceed a quarter of an acre in extent) it is usual to plant apple, pear and plum trees, as well as gooseberry and current bushes. Raspberries and strawberries are also planted, and the remainder of the plot is utilized for growing vegetables, herbs and flowers. The planting is done under the supervision of the instructor who periodically visits the plot for the purpose of directing its cultivation and conducting demonstrations. In all 108 plots of this kind were established.

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*There are 32 counties in Ireland.

The section of the scheme which is most generally appreciated is that of regulating the purchase by County Comissioners of trees in bulk, and the reselling of same at cost price to residents in the counties. Every care is taken to ensure that the trees so distributed are of good quality and free from disease. The Department's horticultural overseer in the first instance inspects the nurseries from which the Committees decide to obtain their supplies, and the advice of the county instructor is afterwards available for the purchasers.

From weekly returns furnished by the instructors, it appears that during the twelve months ended 30th September, 1906, the following varieties and quantities of trees were planted as a direct result of the operation of the scheme:

| | |
|---|---|
| Apples | 33,172 |
| Pears | 1,519 |
| Plums | 2,475 |
| Damsons | 143 |
| Cherries | 122 |
| Gooseberries | 12,457 |
| Currants | 5,233 |
| Raspberries | 5,447 |
| Other fruits | 7,091 |
| Other trees | 158,907 |

## ITINERANT INSTRUCTION IN POULTRY-KEEPING.

Twenty-nine itinerant instructors were employed during the year and their duties as in previous years included the delivery of lectures on poultry-keeping, visiting poultry runs, and giving practical advice to poultry keepers, conducting classes on the fattening, killing, plucking, trussing and preparation of fowl for market, and on the grading, testing and packing of eggs. These classes were conducted on a more extensive scale than previously, and were of a practical nature.

The following is a summary of the work of the instructors in months ended September 30, 1906:

Number of lectures, 2,024; average attendance, 67; number of classes, 629; average attendance, 14; visits (fowl runs), 10,656.

The egg stations, from which settings of eggs of pure-bred hens and ducks were distributed at a nominal charge to residents in the counties in which the scheme operated, were largely availed of during the season extending from the first of December to the 31st of May.

The following is a summary of the number of egg-distribution and turkey stations established in each county during the year 1905-06, and the number of settings of eggs distributed: Number of egg-distributing stations, 495; settings of eggs distributed (hen), 45,726; (duck), 6,683; turkey stations, 404.

It may be interesting to mention the extent to which a demand existed for the various breeds kept at the stations, and, accordingly, the following table has been prepared, showing the number of settings of eggs from each breed sold under the scheme:

| | |
|---|---|
| Minorcas | 5,584 |
| White Leghorn | 9,937 |
| Brown Leghorn | 4,095 |
| Orpington | 8,894 |
| Plymouth Rock | 6,136 |
| White Wyandotte | 4,091 |
| Favorolle | 5,988 |
| Houdan | 1,063 |
| Indian Runner Ducks | 5,443 |
| Aylesbury Ducks | 1,176 |

The following table shows the progress of this scheme since 1900:

| Year. | Counties. | No. of meetings held. | No. of Egg Distribution Stations. | | Egg Distributed. | No. of turkey stations. |
|---|---|---|---|---|---|---|
| | | | Hens only. | Hens & Ducks. | Dozens. | |
| 1900-1, | 4 | 223 | ...... | ...... | ...... | ...... |
| 1901-2, | 12 | 1,134 | 36 | ...... | 4,108 | ...... |
| 1902-3, | 22 | 2,231 | 220 | ...... | 18,040 | ...... |
| 1903-4, | 32 | 3,185 | 346 | 46 | 40,857 | 181 |
| 1904-5, | 30 | 2,662 | 333 | 129 | 49,181 | 328 |
| 1905-6, | 30 | 2,024 | 315 | 180 | 52,409 | 414 |

## ITINERANT INSTRUCTION IN BUTTER-MAKING.

Twenty-eight instructors were employed in twenty-four counties during the year 1905-06 in connection with the operations of the scheme of instruction in butter-making.

The practical instruction given at the meetings held at local centres has been greatly appreciated, and the demand for instruction of this nature continues to increase.

The following is a summary of the operations of the scheme during the year: Number of lectures, 328; number of daily classes of from two to four weeks' duration at each centre, 3,232 (the average attendance being nine pupils). In addition 2,477 visits of inspection were made to private dairies."

The following statement shows the number of counties in which instructors have been employed each year since the inception of the scheme:

| Year. | Counties at work. |
|---|---|
| 1900-1 | 1 |
| 1901-2 | 4 |
| 1902-3 | 11 |
| 1903-4 | 18 |
| 1904-5 | 22 |
| 1905-6 | 24 |

This report ought to be of service to those of our people in the United States who are endeavoring to secure a better agriculture for her citizens. It points the way to increased and more profitable production. It has brought the wheat crop of Ireland to 37.8 bushels per acre, rye to 27, barley to 46, oats to 57, and potatoes to 207, not to speak of the fruit, dairy and poultry industries which have all in like manner been greatly advanced.

## GOVERNMENT AID.

In Ireland and in the other foreign countries work of this character is undertaken by the Government. In some countries it is conducted almost wholly under central governmental auspices. In others it is in cooperation with provincial Governments and local societies, but in every case the introduction of the system has been through central governmental initiative and control, as in England, France, Germany, Italy and other European countries, with uniformly highly beneficial results, as the agricultural production of these countries demonstrates.

In the United States we have depended largely for the dissemination of agricultural information upon bulletins and the columns of the public press. While these agencies are absolutely essential they of themselves are comparatively helpless to secure such changes as are needed in the practice of the individual farmer whose education has been limited, and whose opportunities for observation have been few.

When it is remembered that 94 per cent. of the population of the United States are restricted in their education to that given by the common schools it is little wonder that agricultural knowledge among rural people is limited largely to traditional methods. If agriculture is to be improved it is absolutely necessary that this great body of workers, 94 per cent. of our population, shall have the advantage of the discoveries of modern science along the lines of increasing production, and it is becoming very clear that there is no way by which this can be so rapidly and economically effected as through the sending of expert teachers to instruct them by meeting them at their homes. The experience of every European country has confirmed this view, and their practice for many years has been chiefly confined to this method of imparting information with the remarkable results to which attention has been called.

While this work is properly that of the several States both as to its control and operation, and would finally be lodged with them, yet in order to introduce the system and show its practicability and adapt it to the conditions which prevail in the United States, much time would be gained and many mistakes avoided if the National Government should first make an investigation of the entire field which the system is to cover. For this a corps of expert investigators could be employed to devote their entire time to the discovery and perfecting of a system suitable for use by the agricultural educational institutions of the country, in order that all of these agencies might avail themselves of the latest and best methods for teaching agricultural subjects both to classes in school and college, but most important of all, to the mass of people who can never go to the higher industrial institutions of learning. A similar body of experts could likewise be employed to go into the several States upon invitation of the proper local authorities to demonstrate as teachers the value of the methods desired to be introduced.

## DISTRIBUTION OF INFORMATION, THE GREAT NEED OF AGRICULTURE.

There is just now a great accumulation of agricultural information stored in books, bulletins, offices and in department bureaus and reports. Like a bountiful supply of water in a reservoir, there is needed before it can be of service, distributing mains and pipes to lead it into the homes of the people who need it for daily use. Distribution of information is the most crying need in agriculture to-day; greater than investigation, research or higher education, necessary as these all are.

The several states and the National Government which established the Land Grant Colleges for instruction in agriculture and the mechanic arts, and the agricultural experiment stations for research, cannot afford to neglect to provide that the results which these institutions have discovered and will continue to discover are disseminated and put to use as rapidly as possible, and not remain unutilized for lack of conveyance to the homes and into the practice of people.

Congress by the Land Grant Act of 1862 and by its several supplements provided for higher education in agriculture, and by the Act of 1887 establishing the experiment and research stations, made provision for the discovery of new truth in agricultural science and practice. It now remains for Congress and the several States who accepted the provisions of these several Grants to complete their work in industrial education by providing for the proper distribution of the truths discovered among those who from lack of money, previous educational advantages, or because of family ties and duties are unable to go to college or to understand and intelligently apply the methods which the scientific institutions of the country have discovered as adapted to their use.

The necessity for such distribution just now in this country needs no argument to prove. It is manifest on every side, and is voiced by every intelligent farmer and by every industrial educational institution in the land. The practicability of the methods proposed for instructing agricultural people has been demonstrated through a long period and on an extended scale by every European country until there is no longer any room for doubt in this respect, and the great value of these methods to the country is manifest from a comparison of the agriculture of the United States with that of those countries that have adopted the form of distribution which employs the itinerant school, the advisory instructor, and the demonstration farm and field in the dissemination of agricultural truth.

The CHAIRMAN: You have heard this able paper; what is your pleasure?

GEN. BEAVER: I move it be received and placed on file. Will you let me make a remark about it? One of my neighbors here said a moment ago, "He seems to be mad about it." No wonder he is mad! If Ireland can raise 37 bushels of wheat a year where we can raise only 12, it is time to get up some sort of feeling that will arouse our ambitions and our energies. I said to the farmers up at State College the other day that we want to mix with our agriculture what the great painter, Turner, mixed with his paints; some one once asked him with what he mixed the paints that produced such wonderful results on canvas, and he replied, "with brains, sir." So we want to mix our agriculture with brains. When the Secretary of Internal Affairs of the United States, James R. Garfield, drove over the campus at State College a short time ago, he said to the man who was with him, "Do your farmers raise any more corn in view of this college than they used to?" Gentlemen, the time has come when we must learn how to make a ton grow where we formerly raised half a ton; to do this, we must know what fertilizers to use, and how to use them, and where, and when to use them, and that knowledge must be disseminated from one end of the State to the other. It has to teach the farmer of Pennsylvania how to raise forty bushels of wheat to the acre, where he now raises twelve; and how to raise a hundred and twenty-five bushels of corn to the acre, where he now raises twenty-five. It can be done, and it must be done, but the question is, how shall we teach them? We must get the farmers of Pennsylvania to realize that they are simply playing at farming, and that it is time to get down to real work, but the question is how? I thank Prof. Hamilton for bringing to our notice what is being done in what we have always regarded as one of the most poverty-stricken countries. Why, I remember when we used to send ship-loads of supplies to famine-stricken Ireland, and it had really impressed itself on my mind that it was still so, while, as a matter of fact, the Emerald Isle is getting down to teaching us how to do it—how to raise crops. We shall have to begin at the top. I used to think differently. I thought we must begin at the bottom, and learn upwards, but I have changed my mind. We must begin at the top, and teach the teachers. Where does Ireland get her experts from? Why, from the colleges where they educate them. How did Prof. Surface become such a famous entomologist that he is known throughout the country, and can tell the diseases and their remedies? He came from the college that produces experts—

PROF. SURFACE: I got my inspiration from Prof. Hunt, your present Agronomist at State College.

GEN. BEAVER: I am glad to know that. We have got to get these experts to get in touch with the farmers of the State and teach them, and then we will get results. We have got to come before our Legislature, and get them to give us the same appropriation that England gives Ireland. Why, Ireland is kicking all over the world about the way she is being treated by England, and yet what she receives in agriculture would put us to shame, and we rest satisfied. It is time to arouse the farmers to their work.

MR. MARTIN: May I be permitted a word of approbation for this very able paper? It is profitable in many things for Pennsylvania, as indicating the way, especially in what it says regarding the work of the itinerary schools in reaching the farmer, and teaching him the things necessary for him to know. We are already making an effort to do this; we have two or three of these itiner ary schools in a primary way, and we have at present no less than thirty applications for them. It is the old cry of "come over into Macedonia and help us."

But so far as comparing the crops of the United States with these of foreign countries, is it quite fair to take the wheat crop of the entire United States as the basis of the average? Some of the states are not adapted to the raising of wheat, and to include these non-wheat growing states reduces the average of those adapted to its growth. Take the large wheat-growing states of the West, and their average is way ahead of any of these foreign countries. In making up these averages, would it not be fair to take the averages of the wheat states as a basis? Now, for instance, we all know that Maine is a great potato-growing state, and it shows up well in potatoes, but not so well in wheat; while in the Southern states the crop of seed potatoes is small, and this reduces the average of the United States. But all things considered, my friends, this paper is a high-water mark, and will no doubt stimulate us all to greater efforts in practical farming.

The SECRETARY: When I spoke to Mr. Hamilton, he suggested that I had better get some one else to fill the place, and I told him he was the man we wanted, and since I have listened to his speech, I think of something that happened when I was a little boy. There was going to be a Methodist Quarterly Meeting in our town, and the Presiding Elder was expected to be there and preach, and when the time came, of course everybody turned out to hear him. But, unfortunately, it happened that he was prevented from coming, and the preacher fearing that he could not preach as good a sermon as was expected from the Presiding Elder, asked another preacher from town to take his place. Well, the good brother was willing, and sat to work to prepare a sermon that he felt would compare favorably with that of the Presiding Elder, had he been there. You see, he didn't want to disappoint the people. After the sermon, one of the members came up and said to him, "That was a fine sermon you gave us; if I hadn't known you so well, I wouldn't have known it was you." So you see we lost nothing by getting Mr. Hamilton to come here instead of the other man.

PROF. SURFACE: I don't know when I have heard a paper that contained so much food for thought, so much protein, as this paper does. The question of increasing the production of the soil is one of the most important that engages our attention at this time. The possibility of increasing this production by feeding the soil is the one thing that we must impress on our farmers, and, as Prof. Hamilton said in his paper, and suggested in his bulletin, the Agricultural College is the source from which this instruction must flow out, and if the people cannot come to the school, the school must come to the people. We are now preparing to carry this out. I have twenty-eight men now going from orchard to orchard in Mechanicsburg. One man goes ahead, and puts a number on the tree, and then the others go over the ground, and look over the trees, and try to see what is the matter with it, and what shall be done with it. What branches shall be cut off the tree; what shall be done with it? Then the experts come along. To-night we call them together, and have a recitation on the subject, and I shall sit up with them, as I did last night, up to eleven o'clock.

We have had these instructions for a week, and at night we work hard to qualify men further who are already qualified to go out and render service, as you know they have already done. It is at least a beginning along the lines suggested by Prof. Hamilton.

I know one school of fifty-six pupils where they are begging the teacher to teach them the things in Nature study that they ought to know, but how can one teacher do justice to fifty-six pupils? How get the best results with that number? So long as the teacher has that large number to contend with, the best results cannot be obtained. Prof. Hamilton thinks the teacher should not have more than fifteen pupils. I have always advocated eighteen as the very highest number any teacher can handle so as to get the best results, the results that are expected, and that he should get. So long as he is expected to handle a large number, how do we expect him to cover any ground in a practical way? We must provide for the reduction of the numbers in our school-room, so that the teacher can teach properly. And as General Beaver said, we must begin at the top. Our scientific men must be led to come down to the soil, and soil their clothes, and soil their hands if necessary, in order to find out how to do things, and why. Then, when the farmer's boy and the farmer's girl have learned to work out the scientific problems that confront them in their own soil, on their own farm, and in their own kitchen, agriculture will have received a new inspiration, and we shall have the new agriculture that we are hoping for and working for.

DR. CONARD: The paper presented by Dr. Hamilton is one that is extremely interesting to an agriculturist. But there is another side to it. We have been comparing ourselves with countries which have been under cultivation for generations, and in which it has been a problem to feed their population—in which, necessarily, every man has been taught to use to the best advantage every foot of ground. These are the conditions with which we have been comparing ourselves. But here, during the last thirty-six years, we have gone through a period of reclaiming the desolate South, laid waste by the war; we have given our attention to the opening up of new lands; we have given some attention to irrigating the unproductive parts of the country and making them productive. We have been expending in acreage, rather than in averages. Now, I think we have held our own pretty well, taking all these things into consideration. We need not hide our heads in shame over what we have done. It appears to me that we are not so far behind as it has been made to appear.

The CHAIRMAN: I was beginning to be kind o' glad that my people came from Ireland. I thought nobody could farm but the Dutch, but after this I will not take a back seat.

PROF. MENGES: You let the Dutch alone; they can take care of themselves when it comes to farming. In fact, I guess you'll have to take a back seat. I'm not ready to do so myself.

The CHAIRMAN: The Professor used to say years ago "nothing does them as much good as stirring them up," and I believe that this paper will stir them up. That is what it is intended for. Now, there is a motion before the house; has anybody seconded the Governor's motion?

The SECRETARY: I second the motion.

The CHAIRMAN: All those in favor of the motion will please signify it by rising to their vote.

The motion was carried by a unanimous rising vote.

The CHAIRMAN: That is your thanks, Professor. Has the Committee on Credentials any further report to make?

MR. HALL: Yes, sir; we have in our hands the credentials of Governor Beaver and R. H. Thomas, and the Hon. R. I. Young, and in behalf of the Committee on Credentials I move that these be accepted and be added to the list.

This motion was properly seconded, and the question having been put, was agreed to.

The CHAIRMAN: Now, gentlemen, we welcome you, distinguished men as you are, and hope to have the benefit of your counsel and advice. Now, looking over this array of faces before me, I can't help thinking of what a stranger from another state said to-day when he came in and saw the fine-looking faces before me. He said, "I tell you that is a strong body of men"; he meant mentally, of course, rather than physically, and I think he is about right.

GEN. BEAVER: Is it in order to present a resolution appreciating the work which has been done by the Division of Soils of the Department of Agriculture of the United States?

The CHAIRMAN: Why, yes; we will receive such a resolution.

GEN. BEAVER: I will then offer this resolution: "Be it resolved by the State Board of Agriculture now in session, that the Department of Agriculture of the United States be requested to continue the investigation of soils in Pennsylvania, they have already made in some of the counties of the Commonwealth." I make this a formal motion.

The SECRETARY: I second that motion.

The question was put, and the motion agreed to.

MR. McGOWAN: With your permission, I wish to offer this resolution: "Be it resolved: that it is the sense of this State Board of Agriculture that we express our deep sorrow and sympathy for the people of Boyertown, Berks County, who were visited with such a terrible calamity resulting in the loss of so many precious lives. Among the afflicted families, we are sorry to learn, was that of Dr. J. H. Funk, our State Pomologist, who mourns the loss of a son-in-law, a grandchild, and others of his family, who were badly burned in the fire of the Rhoads Opera House at Boyertown. It is to be regretted that so many valuable lives were blotted out in the twinkling of an eye.

"We mourn with those who mourn, and weep with those who weep.' "

HOWARD G. McGOWAN, Berks County,
S. S. BLYHOLDER, Armstrong County.

MR. BLYHOLDER: Some of the members may wonder why my name is attached to the resolution, coming as I do, from the opposite end of the State from the other brother whose name is attached to it, but I come from the place which was the home, and the birthplace of the lady who is the author of this play, and of the lady who lost her life in that fire, and I have known these two ladies. They have been workers all their lives for the betterment of mankind, and have spent their time and their energy for the elevation of their fellowmen. I therefore desire to second the resolution of Brother McGowan's.

The CHAIRMAN: You have heard the resolution; all those in favor of adopting it, will please say "aye."

The vote resulted in the affirmative.

The CHAIRMAN: Is there any other business before the house?

MR. GLOVER. I should like the members of the Executive Committee to meet me in Mr. Martin's room, Department of Agriculture, immediately after adjournment.

The CHAIRMAN: If there is no further business before the house, a motion to adjourn is in order.

A Member: I move we adjourn until this evening.

This motion was properly seconded, and, upon the question being put, was agreed to.

The CHAIRMAN: The meeting stands adjourned until half-past seven this evening. I hope every member will be here on time; we have a long and interesting program.

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Harrisburg, Pa., Wednesday Evening,
January 22, 1908, 7.30 P. M.

The meeting came to order with Mr. Blyholder in the Chair.

The CHAIRMAN: The meeting will please come to order.

The SECRETARY: I would like to make an announcement, and also a motion. You will notice on the program for to-morrow afternoon that the last number is a paper by Prof. Fries on "Nitric Acid from Atmospheric Nitrogen." I have a letter from Prof. Fries, stating that he will be unable to be here, but he has sent his paper, which is not typewritten, and you know how these fellows write; it will probably be of as much service if printed with the proceedings of the Board, and if some one will make that motion—

MR. SCHWARZ: I will not make that motion, because that is one of the most important subjects we have, and we want all the light on the subject that we can get.

The SECRETARY: I don't think he will help you very much, because he only states the possibility of getting it, but does not tell us how it can be done.

MR. SCHWARZ: If that is so, I will make the motion that this paper be received, and printed with the proceedings of the meeting.

The motion was properly seconded, and the question having been put, was agreed to.

The SECRETARY: Now, in making up the program, I first have to ascertain who will be here, and whether he is willing to take part in the program. Of course, when I get their consent to be here, I cannot know exactly the time when it is most advantageous for them to be here. Now, Dr. Hunt's work at State College is very important, and if he is allowed to deliver the address for which he is down in the evening, in the place of Prof. Fries' paper, it will allow him to get home to-morrow and save a day in his work at the College. I therefore move that Dr. Hunt be allowed to read his paper to-morrow afternoon, instead of to-morrow evening.

MR. SCHWARZ: I second that motion.

MR. HERR: I would like to know when he is down on the program now.

The SECRETARY: The latter part of the evening.

The question having been put, the motion was found to be carried.

MR. HERR: Since our last meeting of the Board, several members are no longer with us. I refer to Col. R. H. Thomas, an appointee of the Governor, and to the Hon. William H. Brosius and Prof. George C. Butz. I move that a Committee be appointed to draft resolutions with respect to the death of these gentlemen.

MR. SCHWARZ: I second that motion.

The CHAIRMAN: What is the pleasure of the house in regard to this motion?

The question having been put, the motion was agreed to.

The CHAIRMAN: I will appoint this committee a little later. Is there any further business to be brought before the Board? If not, we will proceed with the program. The first number for the evening is one left over from this afternoon—that of Dr. Patrick, the Sanitarian. Is Dr. Patrick present?

Dr. Patrick did not appear to be present.

The CHAIRMAN: Since Dr. Patrick does not respond, we will proceed with the next number, the report of Dr. Frear, the State Chemist.

The SECRETARY: I have a letter from Dr. Frear, stating that he will be unable to be present, but will send his report to me, and I will, unless otherwise ordered, include it in the proceedings of the meeting.

The CHAIRMAN: Are there any objections to this? Hearing none, it is so ordered.

Subsequently Dr. Frear submitted the following report:

## REPORT OF THE CHEMIST.

BY DR. WILLIAM FREAR, *State College, Pa.*

The subject of paints, their purity and durability, possesses especial interest to the farmer because he uses far more paint than the average citizen, and because for his uses paints of high durability are especially needed, since they are required chiefly for application to the exterior of dwellings, barn buildings, fences and implements. The experience of recent years and vague information that has drifted through the community, have led many to the belief that the paints and related materials on sale in American markets are often far below standard in composition, durability and other important properties.

In order that the subject may be clearly understood, let us consider briefly the essential characters of oil paints, the only kind of paints important in this relation. Oil paints consist essentially of two materials, a solid pigment and a liquid part. The liquid part is primarily composed of one or more drying oils. For the cheaper paints used in coating the outside of buildings, linseed oil is the only drying oil largely employed, while for artists' purposes, other oils, such as walnut oil, are used.

The value of the drying oils for this purpose is due to their property of drying when exposed in a thin layer to the air. When thus exposed, the thin oil film rapidly takes up oxygen from the air and forms a substance, varnish, which is both hard and tough; that is, is not easily cracked or pulverized by exposure to varying temperatures, vibration or light blows.

Experience shows, however, that when a hard oil finish on wood is exposed to rain or sunshine, it rapidly loses its gloss and disintegrates; hence such a finish prepared from linseed oil alone is not sufficiently durable for an outside coating of wood structures.

It has, however, long been known that if certain pigments be thoroughly incorporated with the drying oil, a thin layer of paint thus prepared, dries rapidly and forms a glossy, tough coat, which is much more durable when exposed to the weather, protects properly seasoned wood from decay, and at the same time, because of the variety of color that can be secured by the use of different pigments, makes possible the use of paint for a much wider range of decorative effect.

It may be noted in passing that even the most durable paints are not absolutely impervious to moisture, but that damp air will pass slowly through them to or out from the wood they cover. They do, however, prevent wood in contact with the air from absorbing large amounts of water, and also from contact with a great variety of organisms that tend to produce decay. In some cases, too, the pigments are poisonous to such organisms and might serve in part to arrest decay already started.

In addition to durability, a good paint should possess body; that is, the power to conceal thoroughly underlying layers to which the paint coat is applied; and also covering power; that is, the property of being capable of spreading uniformly from a brush over a large surface.

Oft-times the painter desires to increase the covering or spreading quality of a paint, and for that purpose mixes with the paint volatile liquids known as thinners, which rapidly evaporate from the thin layer of the paint-coat leaving the drying oil exposed to the air. It is probable that the formation of varnish from the drying oil is not so simple a chemical process when the oil is thoroughly mixed with certain pigments; such, for example, as white lead. Experience shows further that where thinners are employed, the physical quality of the paint coat is not so good, that is, not so tough, durable and glossy as where the oil hardens in the absence of thinners. The principal thinning agent which is in use by painters upon first-class jobs is spirit of turpentine, and even this thinner must not be employed in too large proportion.

Prominent adulterants of the liquid portion of paints are semi-drying and non-drying oils such as corn or maize oil and cottonseed oil, which are used as partial substitutes for linseed oil, and largely diminish its varnish-forming power. Benzine from petroleum and water are the other principal adulterants of the liquid portion of oil paints. Benzine is used as a thinner, being a substitute for spirits of turpentine. It volatilizes more rapidly than the turpentine and leaves a fair inferior coating. Benzine is much cheaper than spirits of turpentine, and water is simply a make-weight which seriously reduces the gloss and life of the paint coating. Water has the quality of giving to mixtures of some pigments, such as white lead, and linseed oil, the appearance of a thicker consistence, sometimes termed "a livery condition." Paints in this condition do not spread uniformly from the brush.

One other ingredient sometimes used in the liquid portion of the ready-mixed paints is what is called a drier. For this purpose either boiled oil or a japan is used. Both of these preparations are made by heating linseed oil in contact with oxid of lead (litharge) or other metallic compound. In these processes the liquid takes up a little of the metal which seems to act as a carrier of oxygen, so that these driers possess, under certain conditions of use, the property of forming varnish very rapidly, and when mixed with an oil compound, of securing a rapid drying and hardening of the coating which is often desirable in painting exterior surfaces in showery weather, or the interiors of rooms that must be quickly prepared for use. It is generally known, however, that excessive use of driers is not advantageous and that where used in any considerable quantity, the paint coat suffers in gloss and durability.

It would be impossible in this brief paper to discuss in detail the numerous pigments employed in the manufacture of paints. In order that the paints may have both body and a large covering power, it is clear that the pigments must be distributed through the paint in a very finely divided condition. This is generally secured by grinding them in oil as the final step in the process of manufacture. With the exception of reds and yellows, the principal paints used for the exterior of dwellings, barns, etc., are made by mixing a large proportion of a white paint and a small quantity of some highly colored paint or paints, thus producing the delicate shades of color preferred for decorative purposes. It is clear, therefore, that so far at least as paints for wooden structures are concerned, the white paints used as the bases for the various paints are most important. Attention will therefore be confined chiefly to them. The best known and most widely accepted white pigments for making oil paints are Dutch-process white lead (a hydrated lead carbonate) and zinc white, which is composed chiefly of zinc oxid. The white lead is very heavy, flows very evenly from the brush and has a very good body. However, it turns yellow to black when exposed to air containing sulfurretted hydrogen. It is sold either dry or mixed with about 9 per cent. of raw oil. The so-called pulp white leads contain considerable water, while they are said to flow even better than the pure lead and oil mixture, but have disadvantages as were above mentioned. Sublimed white lead is quite different chemically from ordinary white lead, imparts high body to the paint, is probably equal to the Dutch-process lead in covering power and wearing quality, and besides does not blacken like the latter. Zinc white, Chinese white, is lighter in weight than either Dutch-process or sublimed white lead, is very permanent in color, possesses a somewhat bluish tinge rather than the dreamy white of the above mentioned lead pigments, but requires more than twice as much linseed meal as they do to prepare a satisfactory "still paste," that is, the mixture of oil and pigment sold in bulk for painters' use and requiring further admixtures of oil before the paint is ready for application. Zinc white has a better covering power than white lead, but is very deficient in body, so that it is very commonly mixed with other materials to correct this deficiency.

Other white materials are very frequently substituted for the high-grade pigments above mentioned. Among these may be mentioned lithophone, a mixture of barium sulfate, zinc sulfate and zinc oxid. This is sometimes called sulfite of zinc white, another similar pigment is Charlton white. These materials are non-poisonous, do not discolor easily except when mixed with lead or copper pigments, and have excellent body. Their own color is, however, not uniform. At present they are employed chiefly for inside use. Barium sulfate, commonly sold as barytes or blanc-fixe, is very heavy and of low covering power; that is, has little body, does not work well in oil, works out streaky from the brush and dries very slowly. Calcium carbonate sold as Paris white, English white, whiting, etc., is a dull white powder which turns dirty grey when mixed with oil, and requires a large amount of oil to make a paste. Putty is simply a mixture of whiting with 18 per cent. of linseed oil.

Calcium sulfate, mineral white, is rather transparent when mixed with oil, but has a high covering power.

White clay, China clay, has little body when mixed in oil. The same is true of silver white, silex or silicia, Speaking of the pigments other than white lead and zinc white, Sabin, an authority on paints and varnishes, says of these, the "barium paints are the least objectionable, being in fact substances chemically inert and of suitable composition; but they are practically without covering power, being nearly transparent in oil, and while they probably help to protect the wood, they are really used only to cheapen the paint, and commonly to increase the profit of the maker or dealer; not at all for a benefit to the consumer."

The attention of the writer was attracted to this subject when he received for analysis, some months ago, several samples of ready mixed paint advertised for farm use. One of these samples, a white paint, contained about one-third by weight of liquid material composed of oil and a large fraction of benzine. Two-thirds of the weight was a white pigment of which only one-half was made up of high-grade materials, white lead and zinc oxid, the rest being composed of barium sulfate, calcium carbonate and a little clay. The mixed paint, it was recommended, should be mixed before using with an equal volume of linseed oil, a low grade of this oil being furnished by the makers of the paint. This mixture, when prepared according to directions, was very thin, and, upon test by a practical painter, was pronounced "very poor."

A second sample was a red paint of very fluid consistence. The liquid portion, amounting to about 40 per cent. contained both water and benzine. The pigment contained less than 2 per cent. of red lead and about 10 per cent. of Venetian red (lion oxid). Over three-fourths of the total weight of the pigment was composed of chalk, barytes and clay. This mixture too was pronounced very inferior upon test by a practical painter. However inferior barytes, whiting and China clay may be as pigments for imparting a glossy, durable coating to a smooth-finished wood surface, it is only fair to remember that not all wooden surfaces are of this character, and that coarser-grained pigments are sometimes desirable for "filling" rough surfaces. Thus, the Pennsylvania Railroad Company in its specifications for freight-car color, specifies that the pigment shall consist of iron oxid, 50 per cent.; gypsum, 45 per cent.; and calcium carbonate, 45 per cent.; but prohibits the use of barytes or dehydrated gypsum which has less body than the fully hydrated substance.

Notwithstanding the facts just mentioned, close study of the analytical data shows that these paints were very inferior articles, unfitted for application to a surface of good finish and for giving an opaque, glossy, durable coating.

A very important work in the study of paints has been performed by the North Dakota Experiment Station.

As a result of the analysis of nineteen samples of paints sold as white lead, four were found to be true to name, one, a mixture of white lead and zinc oxid, and the remaining fourteen to contain large admixtures of barytes, chalk, clay, etc.; in other words, only about one-fifth of the samples were true to name; and these samples it should be noted, represented most of the brands of white lead on sale in North Dakota markets.

An examination further of white mixed paints and of light tinted paints with a white base, comprising ninety-one samples representing about as many brands, showed but one instance in which white lead was used as the sole base, five in which zinc oxid was so employed, twenty-five in which various mixtures of these two ingredients constituted the base, and sixty cases, or two-thirds of the entire number, in which bartyes, chalk, and other adulterants were employed. The liquid portions of these paints contained benzine in thirty cases, sometimes large quantities of it; and in twenty-eight cases, water in quantities ranging from 8.25 per cent. was present. In general, it appeared that if one were purchasing white lead, there was about one chance in five of his getting what he asked for. and if he would buy the white or tinted paint, there was only one chance in three that he would get an article of good quality. It was true almost without exception that where benzine was used as a drier, water had also been added in large quantity.

So far as examinations have been made in other localities, they indicate that fraud in the paint trade is equally predominant. Consequently, the last two or three years have witnessed a very widespread movement to correct this evil. North Dakota passed the first pure paint law, and required that all paints except those made of pure white lead, zinc white, linseed oil and turpentine or japan drier, must have upon their labels a true copy of the formula followed in their manufacture. All packages were further required to bear a statement of the net weight of the paint contained. This law has been attacked as unconstitutional, but the United States courts have affirmed the constitutionality of the Act. There is at present pending before Congress, a National Paint Bill. The New York Legislature is likewise considering a pure paint bill, and a number of other states have either passed such laws, or are agitating their passage. The subject is one that merits the attention of Pennsylvania buyers of paints.

It is true that our linseed oil sold as such is already tested by the State, but such testing becomes of less importance as the trade in ready-mixed paints increases in volume, and these paints are shown by the investigations above mentioned to require, far more than linseed oil, the control of some properly authorized public agency.

The CHAIRMAN: Next on the program is the report of the Microscopists and Hygienists. We will now have the pleasure of listening to Prof. Cochran:

## REPORT OF MICROSCOPIST AND HYGIENIST. No. 1.

By Prof. C. B. Cochran, *West Chester, Pa.*

I want to begin my talk by calling attention to one or two samples which I have brought with me and placed on the table. This one is a sample of honey dew, from chestnut leaves. The other is poplar honey. I thought this honey dew might be interesting to you. It was brought to me by an apairist living about eight miles from my home at West Chester. I have made three analyses of the article, and find it closely resembles ordinary honey extracted from flowers and plants. It has the same chemical analysis.

The topic on which I want to talk to you this evening is Coal Tar Colors in our foods. These are exceedingly numerous substances. There are over two thousand of them quoted. I have in my laboratory about two hundred and fifty of these colors, and during the past year I have made a very careful analysis of about two hundred of them. As a witness on the stand, I am often asked do I find coal tar there. Lawyers often confuse coal tar color with coal tar. Now, they might just as well ask if we find any potatoes in Irish whiskey, which is made from potatoes, as to ask if we find coal tar in coal tar colors, because coal tar bears no more resemblance to it than it does to the air and soil from which it is derived. Coal tar is a large subject, and if you will bear with me just a moment, I will call attention to just a few of the products derived from coal tar, in a general way.

If we put coal tar in a retort, and subject it to heat, there results from this distillation an ammoniacal article, the water of which contains considerable ammonia. Then there comes a substance which is known as Carbolic Acid Phenol. A little later come the heavier oils, and then the solid, as you see in that bottle, known as Naphthaline; from it is derived the Moth Tar Marbles, sometimes called Tar Campher. There is one component that is white; it is known as anthracine; the other products leave the retort as what is known as Coal Tar Pitch, a product which is a hard, solid, brittle black mass. This is mixed with some of the products of coal tar, and makes a roofing paint, and the difference between it and coal tar is that some of the water which causes it to absorb in the timbers has been removed.

Now, we start in to get coal tar colors. Here is one of the colors, a red coal tar color, which is often found mixed with the gluten feeds. As I have said, they are exceedingly numerous, and are all colors and shades of colors, so that nearly every colored article of wearing apparel is colored with one of these coal tar products. They have taken the place completely of the vegetable and animal colors.

Now, as to the use of coal tar colors in foods. Many of our foods have no color, and sometimes, when they have, the color is not so decided as we would like to have it, therefore the color is made by the addition of a little coal tar color that will give a similar hue to the article, but of greater intensity than the article would naturally have. Just a few of these I have brought with me, and want to show you. Here is one sheet on which there are some pieces of wool which were white, but which were colored with coal tar colors that have been extracted from food substances. The first one to my extreme left was extracted from cranberry sauce. It seems that in this particular instance the cranberry sauce did not have as high a color as they wanted it to have, so they colored it with coal tar products, and a little of that color dyed into this piece of wool, is what you have right here.

You know that in the markets of the State are bakers' supply houses, where bakers can go and obtain almost any thing they want. A sample of huckleberry pie filler was taken from one of these bakers' supply houses, and here is a piece of wool dyed with the coal tar color which was extracted from a small amount of huckleberry pie filler. Huckleberries are usually of a very dark color, and they should have color enough in themselves, but in this particular instance, it appears they lacked the necessary color, and it was supplied by coal tar dye.

The next one that I want to call your attention to is a plum pie filler, the coloring matter of which was made from coal tar color, and the sample to my right is a piece of wool dyed with a small quantity of the color extracted from currant jelly. The piece of wool was originally white. Now, red currants have usually enough color, but in this case the color was supplied by the introduction of coal tar color.

Here is a sheet containing a number of coal tar colors which have been dyed into pieces of white yarn. These are all coal tar colors that have been derived from various samples of Port wine. Port wine is the product of the grape, but in these particular samples, the port wine from the grapes did not have a high enough color, and consequently the color is obtained by putting in the coal tar color, and making it a brighter red, and more nearly the color desired.

Meats of all kinds and descriptions are also colored with different coal tar colors. Here is a piece colored from a coal tar color called a "Blood Red," and used in a Chicago packing house to color and preserve meat. It contains a mixture of salt, saltpetre and boric acid, and is colored by a coal tar color. This was obtained direct from a Chicago packing house.

Here is a color, a coal tar color, used in coloring smoked meats, and called Ceylon Cola. It is a very dark red, and is very highly advertised as a coloring matter and preservative for meat, and as a substitute for smoke. I was considerably amused at one of the uses for which this coloring was advertised. It was as a preservative of fence posts, by dipping the posts in the color. I suppose that the persons who recommended it knew that dipping the posts into tar was a preservative of them, and thought the coal tar coloring would have the same effect as the tar. You might just as soon expect to get the same effect from whiskey as from rye.

The sheet that I showed you a moment ago contained reds taken from Port wine. These reds are the return from Blackberry brandy. Of course, we all know that the term "brandy" is somewhat of a misnomer; it is not properly a brandy. But we should suppose that the dark color of the blackberry would be sufficient to color the brandy properly, but in this case it does not appear to have been so, because its dark color is due to coal tar dyes. There are different colors that can be used, and that were used to give this brandy the proper color.

Tomatoes are red usually, sometimes yellow, but we should at least suppose that there would be enough color in red tomatoes to color the tomato catsup without being compelled to resort to coal tar colors, but here are eight samples of wool, all of which have been dyed with coal tar colors derived from eight different brands of tomato catsup. The color was made bright enough to appeal to the customer by the use of coal tar color.

You know that at some seasons of the year, particularly in winter, the hens produce eggs, the yellow of which is not a very bright color. Now, when you use these eggs in making a cake, you can't get a rich color, and to offset that, there has been put on the market an egg color in coal tar colors. It is used in cakes by bakers to get the color of the egg. These colors here do not show very well by artificial light. This is a yellow, and this is a red orange, and the two mixed will produce a bright yellow color, show very well by artificial light. The same thing that is true of eggs, holds true of cheese. Many of the cheeses on the market are made up with coal tar color.

Here is a piece of wool that was dyed with the color derived from a blood orange that had none of the red blood in it. It was put there by coal tar color. The same thing is true of the pretty orange color of the soda water you buy; here is a piece of wool dyed with the coal tar color taken from blood orange soda water. This is another dyed from a sample of the orange juice taken from the boardwalk at Atlantic City. The same thing holds true regarding butter. Where the butter is lacking in the desired color, you can use the coal tar colors, and make it have the appearance of a good, rich butter, supplying the natural color that is lacking.

Now, I have been looking at these things from the standpoint of the food chemist. You may perhaps say, why, if the use of coal tar colors improves the color of the butter, or the color of our food articles, why may we not use it, if the article contains just as much pure food? If the food is good, but lacking in color, why not introduce the coloring matter that will give it a better and more natural appearance? It can be used all along the line as an improving agency, but while it is used in that way, in nearly every one of the samples which I have shown you thus far, the coal tar color was not used to improve the article, but to color it. Why was the coal tar color used in cranberry sauce? Not, as I said a moment ago, because the cranberries were lacking in color, but because the cranberries were not there. And here in this huckleberry pie filler the same thing holds true. The huckleberries were not there, possibly one or two dried berries slipped in to give it the flavor. You would imagine that huckleberries were cheap enough to be used in this filler, but their color was cheaper, so they made up a filler, and colored it with coal tar color. So in regard to the Port wine products, and the blackberry brandies. They are original products in every sense of the word. Coal tar products are used to give them the appearance of the natural article, which is not there at all. I recollect one sample of Red Raspberry Jam, put up by a firm in Baltimore, the name of the firm given on the label, and sold under the title of "Highland Brand Raspberry Jam," highly recommended as absolutely pure, and entirely wholesome. Now, what did I find there? It was chiefly glucose, filled in with a little apple juice colored with the coal tar color. It was not quite sweet enough, so a little saccharine was used—by the way, another coal tar product, used sometimes as a stomachic in Diabetes. Salycilic acid was used as a preservative, and to give the appearance of raspberries, alfalfa seeds were used.

Now, in regard to the wholesomeness of these coal tar products,—perhaps I had better say just how they are used. Here is a sample of Strawberry Cream Candy; I took a small sample of that candy, weighed it, extracted the color from it, and dyed it into this piece of wool. I then figured from this basis how much of this Nun's Veiling the coloring matter of one pound of this candy would color, and it is a matter of memory with me now, but I think I can trust my memory in this—I think it is eight square yards of Nun's Veiling could be colored with the coloring matter of one pound of that candy. This should give you an idea of the extent to which this coal tar coloring is used. If it were not for the question of these coal tar colors, the pure food question would be much more simple than it is. Any ordinary adulteration could be detected, but it is not so easy to detect and overcome the insiduousness of the coal tar colors.

Now a word as to their wholesomeness. About fifty years ago the use of coal tar coloring was discovered accidentally by Sir William Perkins. The anniversary was celebrated with a great deal of pomp in this country last year; he was here as the guest of honor. I mention this to show you the regard to which most chemists hold it. Nothing is known of the physical action of these products on the human system. Most of them are supposed to be injurious to health. Some have been proven to be positively injurious to health, while others have been proven to be almost inocuous. The great majority we know nothing about. Some of them are poisonous, but are used in food products. For instance, we have butter color. There are two coal tar products used to color butter. We have one that is not soluble in water, but is soluble in oil, and one that is so poisonous that a teaspoonful will produce death in an adult. Then there is another one that is known as "Marsh's Yellow" that has been used very extensively. We have found it frequently used in mustard, in what is known to the trade as Durham's Mustard, made up of wheat flower, a little cayenne pepper, and colored yellow. You can make about 75 per cent. on it, and put it on the market as "mustard." Marsh's Yellow is one of the poisonous products of coal tar.

I know there was a lengthy program, so I came prepared only to give a very short talk, and it occurred to me that you might be interested in the use of coal tar colorings in our foods—a subject which has interested me very much. I feel that in the use of coal tar coloring we have made an opening that we hardly know where it will end. It is used first in one article, then in another, and then in another, until, from my standpoint, I hardly know where to draw the line.

MR. HUTCHISON: The Doctor spoke about butter color being poisonous, and death resulting. Some people may regard that as simply a statement, but within the last three years the Dairy and Food Commissioner discovered three deaths which occurred in this State, in which children, one an imbecile, got hold of butter color. I saw the stomachs of these victims, and there is no doubt but that their deaths were the result of this butter color. One of them was up in Bradford county, one in Franklin, and one in Lehigh or

Berks, I forget which. Now, there is no doubt but that something ought to be done to prevent people from bringing such stuff into our State and selling it to our farmers. We have tried to get at them, and in one case we did have them treed, but they got out of it. That article should not be allowed to be sold without being marked "poisonous." It is a serious question to have this butter color around the house. I remember that at home our little boy got hold of it and spilt some of it all over his garment, and it dyed it completely. If he had drank it, it would have killed him. Now, you can't get a newspaper in this State to say anything against these manufacturers, because they are heavy advertisers. There are vegetable colors for coloring butter that will do the work just as well. Let farmers use it and thus discourage the use of these coal tar colors. Under the old Pure Food Law, Doctors used to go on the stand and testify in the matter, and up in Northumberland county a learned Judge gave a decision sustaining them. It is rather difficult, under such circumstances, to get at them. They have now put a caution on the label, but that is all, and if you go into the large creameries of the State, you will find that it is still being extensively sold and used. I do not want to mention the name of this particular color, for fear some of you here might think I am prejudiced. A doctor some years ago wrote an article on this color, and they tried to put him in jail for it, but they could do nothing with him, and to-day they are going on and selling, as usual. Something should certainly be done with regard to the use of these coal tar colors in our food productions.

MR. SCHWARZ: Dr. Cochran spoke of the poison in butter color. I want to ask him whether there are colors that are not poisonous?

PROF. COCHRAN: There are hundreds of yellow colors and red colors that have never been examined to find out their effect on the human system. Some of them are known to be harmless, some of them are known to be poisonous, but a good many of them we know nothing about. At the present time the United States Government is preparing a list of these articles, and I am sure this includes butter colors.

Now, Mr. Hutchison has given you the story of some of the things that have happened in this State. He has told you of deaths that have occurred in Pennsylvania. I might make a confession to you; my pride, I guess, will allow me to do it. It is rather humiliating, though, to have to do it at all. At one time I tried a rather serious experiment on myself and two or three others with these butter colors. As the result of this experiment, I make the statement that a teaspoonful is enough to cause the death of an adult. Its effect is nausea, violent retching, and collapse, so that the subject is confined to bed, absolutely helpless, and so weak that he can hardly turn, and has all the time this violent retching. In one instance I saw this retching continue for forty-eight hours after the stomach was absolutely empty. In one of the cases that Mr. Hutchison mentioned, the stomach of the imbecile that died from butter color was sent to me for analysis. I found what I expected, that the stomach was completely empty. I knew that would be the case, because I had seen the effect that it would produce.

MR. PERHAM: We would be led to believe from what we have heard here that all butter was colored with coal tar color. I don't believe that there is a creamery in the State that uses coal tar colors at this time. There is plenty of vegetable coloring, and they have never poisoned any of the other kind of butter, either, so far as we have ever heard.

A Member: Mr. Chairman, does the Pure Food Law allow the use of butter color?

The CHAIRMAN: Mr. Hutchison will probably be able to tell you that.

MR. HUTCHISON: I am not in touch with that department of the work; my part consists of the prosecutions.

The SECRETARY: If the color does not contain anything injurious to health, it can be used, but anything that is deleterious to health, or poisonous, cannot be used.

MR. STOUT: I think it would be well to tell us farmers who do not know just what the poisonous colorings are, and what vegetable colorings are right for us to use.

MR. FENSTERMAKER: I would like to know from Mr. Perham how he knows that what is called a vegetable color is a vegetable color?

MR. PERHAM: We have the manufacturers' word for it.

MR. HUTCHISON: May I ask you whose you are using?

MR. PERHAM: Wells', or any other vegetable color. You will find the printed name of the manufacturer on the label, and his assurance that it is vegetable color. The manufacturers will tell you just what you are using, because they are under the law to do so.

The SECRETARY: I would ask Prof. Cochran to tell us what vegetable colors will answer the purpose?

PROF. COCHRAN: The Anato, sometimes in the form of a liquid, and sometimes as a powder; then there are carrots, and other colors, but the anato is the principal one I think.

The SECRETARY: Many years ago we were told that the odor resulting from anato was such that we would not care to use it for butter color.

PROF. COCHRAN: I do not think so. I know what you refer to, but I don't think it is correct. The seed of the anato, from which the color is made, is about the size of a grain of wheat, and is perfectly red in color, but the inside is white and starchy. A great deal of the anato comes to us in this form, and is prepared here. The West Indians take it and prepare it for their table in such a way that it is not pleasant to us, but the anato as prepared here is not offensive.

MR. STOUT: My question has not been answered to my satisfaction. I wish some one would tell us how to take the carrots, and prepare them so as to make a harmless butter color.

MR. HUTCHISON: There is a color made in York county, the Thatcher Butter Color, which, while it is probably not quite so bright a yellow, will give the butter all the color it requires, and which is, so far as I know, harmless. It has been on the market for some time, and I have never heard any complaint. I do not want to advertise the Thatcher, and if you want any information, you have only to write to get it. You may have to use a little more of this color, but it is an absolutely pure color.

MR. PERHAM: It is not so high in color, and if the butter is kept a year or two, it is not apt to be good.

MR. HUTCHISON: Is any butter good if it is kept for a year or two?

The CHAIRMAN: I am sorry to break off this interesting discussion, but we have quite a long program before us yet, and shall have to proceed with the next report, which is that of Dr. Groff.

DR. GROFF: The anato that you have been speaking of is very much like our chestnut. It is large, and comes in a burr, like a chestnut. The people of the West Indies, where it grows, use it very much as we do here. I should not think of using it in liquid form. The people there only use it in the form of a paste, and they mix it very freely in cakes.

The SECRETARY: What is it dissolved in when it is made into a solution?

DR. GROFF: I would take the color from the seed, and then use an oil; then I would stir the oil, so that it would dissolve rapidly.

The SECRETARY: But what is it dissolved in?

DR. GROFF: I can't answer that.

PROF. COCHRAN: It is dissolved in oil, also in a weak alkal.

PROF. MENGES: The alkali is the objection.

At this point Dr. Groff began to read his report, which is as follows:

## REPORT OF MICROSCOPIST AND HYGIENIST. NO. 2.

## CHEMICAL CLEANLINESS.

By Prof. G G. Groff, *Lewisburg, Pa.*

What can the Hygienist think of except the preservation of health, and the increase of human happiness? How can the teacher aid in the dispersal of knowledge outside his classroom? The Good Book says "The people perish for lack of knowledge." And, yet, within a few weeks, two leading citizens of a foremost county in our own State, have expressed themselves to the effect that no great amount of learning is needed to make good farmers. There are others, also, who hold the same idea, for those destined for many divers occupations.

This summer, in Western Massachusetts, I ate the best butter I have had for a long time. At home I often have great difficulty in buying good creamery butter. It generally has a taste not pleasant to me or my family. In Massachusetts, my brother told me, there were State inspections of both dairies and creameries, and that certain requirements were insisted upon as to cleanliness. The result is shown in the Massachusetts butter, while we have little required inspection of dairies or creameries in this State, and we have a whole lot of very poor butter.

There are all degrees of cleanliness, as well as of dirtiness. My thought is that most people mean to be clean, but do not know how. Thus, most people believe that soap and water will cleanse the hands, but these will not nearly do it. Soap, warm water and a nail brush, used each time before and after milking, will not sufficiently cleanse the hands, so that absolutely pure milk and butter may be produced. No surgeon, worthy of the name, would to-day perform a serious operation without using water, soap, a nail brush, and some chemical, or more than one chemical, to cleanse his hands, and many surgeons, despairing of getting the hands clean, now uniformly operate wearing gloves, which have been boiled, baked or soaked in chemicals, or otherwise made chemically clean.

It is largely because the hands are not clean that milk spoils for the dairyman and is returned to him by the dealer. It is because the buckets, pans and cans are not chemically clean, that other milk spoils. Still other milk is spoiled because the room and the vessels at the creamery are not chemically clean. A little hot water and a dirty cloth will never cleanse dairy utensils as they should be cleansed. Much hot water is needed even to wash a few vessels, and these should then be rinsed in scalding water, or better, steamed, and then exposed to fresh air and sunlight as long as possible before being used again. The dealers in the city should be required to wash and steam the milk cans before returning them to the farm.

It is because the hands of the nurse are not chemically clean that typhoid fever and other diseases are spread through the household where they have once gained admission. A physician with dirty hands is a very dangerous person to admit to your home, for he handles all manner of diseases; but to the credit of the profession, they now generally know the importance of clean hands and clean clothes.

Another hard place to convince the people of the importance of chemical cleanliness is in relation to the drinking water. Almost every farmer will get angry if you say his drinking water is impure, yet very many farm wells and springs and most small streams of the farm are polluted to the extent that they may almost at any time cause trouble in the family. Now, drinking water, like Cæsar's wife, should always be above suspicion. It can only be kept so through eternal vigilance. Water that contains the least trace of sewage or of human waste is absolutely unfit for human ingestion until it has been purified. Some other peoples seem to know this better than we do. The Chinese drink only boiled water or tea (water chemically purified) while many Europeans drink only weak wines or beers, water chemically purified by a small amount of alcohol.

The rat and the mouse are dirty animals and make human food dirty. We often make war against them, but because they destroy food, not because they defile it. Instinctively we detect these animals, and it is well, for besides making foul our food, they are possible disseminators of disease. Both rats and mice, some species more than others, suffer from something very like cancer, a disease becoming alarmingly prevalent, and it is well known in Eastern countries that the rat suffers from the Oriental plague. Would it not be well to have one or two days each year in which to thoroughly hunt out and to destroy rats and mice, on the score of cleanliness?

The housefly is a fearfully dirty creature, and there can be no cleanness where it exists. People have long regarded it as a pest because of its numbers and its dirty habits, but we should look upon its dirty feet and dirty mouth as the means of the dangerous pollution of every house in the land. We have been trying to fight it in the wrong manner, i. e., screening it out of our houses. The place to fight it is in the breeding places. Screen the horse stables and the manure pit, and the fly will very sensibly diminish in numbers. Porto Rico is an island of perpetual summer, and yet without houseflies. Go there and learn how to control them. We read in the Good Book that they were sent into Egypt as a punishment upon the Rulers. Why do we have them?

House dust and dust of cities are both unclean and dangerous. In the house, dust consists of particles of the human body, of clothing, of the carpets, and of the ashes from the stove or furnace. Ashes have been purified by fire, and are only unsightly. The others are dangerous. In towns, the dust of the streets consists largely of human and animal waste, all unwholesome, and often disease-bearing. Think of the fruits and berries exposed to the dust of the streets, hour after hour until sold!

I have been addressing farmers. Far be it from me to say or even think that they or their families are in these matters sinners above others. I do not believe for one moment the statement that we often see, that the country furnishes disease and death for the city. I, on the contrary, after an experience of over twenty years as a health officer, fully believe that, correctly examined, statistics will show that disease of all kinds abounds most where people are most gathered into masses, and where they are most ignorant. These are not the conditions on the farm. My experience has been that it is the cities and larger towns which are the breeding places of smallpox, typhoid fever, diphtheria, scarlet fever, etc., and when we find these diseases out in the country, we have only to hunt long enough and we will be able to trace them to some city, large or small. Indeed, the time has come when this Board should ask for protection against city-bred diseases.

In the struggle after absolute cleanliness, it is well to let Nature come to our aid. She cleanses through the use of sunlight and fresh air. Where air and sunlight can freely enter, the sanitary inspector finds but little to recommend. Too often disinfectants are of no value because ignorantly used. Too often they only cover up one bad odor by another almost as bad. Forcing a little gas through a keyhole into an infected room is worse than useless. It is dishonest, for it offers safety where there is none, and it is giving a stone where bread has been asked. Besides sunlight and air, fire applied directly, or by means of baking infected objects, or by steam or boiling water, and numerous chemicals, are absolute disinfectants.

It is not desired to convey the idea that specific diseases (using the word in its general sense) will be produced by uncleanliness, but a general lowering of the bodily strength will surely be brought about by a disregard to cleanliness of food and drink, and in this lowered condition, disease easily overcomes the body. The dirt most to be feared is the waste from our own bodies. To each class of animals, its own excreta of every kind, i. e., waste of skin, lungs, bowels, kidneys, is deadly poison. Free elimination is demanded for this waste as it is formed; in no other way can the highest health be maintained. The dirt which lurks in dark, damp corners is the kind to fear. Indeed, the trio, dirt, darkness and dampness, invite the presence of another feared trio, disease, death and the Devil.

I have talked plainly about some unpleasant and unpalatable truths. I fully believe that far more harm to health results from impure water and unclean dairy products than from all the adulterated and chemically preserved foods sold within the State, bad as these may be. It is from lack of knowledge that the people perish, while Legislators and Executive Officers too often strain at gnats and swallow camels.

The CHAIRMAN: Gentlemen, you have heard this report. Is there any discussion? If not, what shall be done with it?

A Member: I move it be received and placed on file with the rest of the proceedings.

This motion having been properly seconded, and the question put, it was so ordered.

The CHAIRMAN: We will now proceed with the next question, the report of the Committee on Fruit. Is Mr. Boyer here?

Mr. Boyer then read the report of the Committee on Fruit, which is as follows:

## REPORT OF COMMITTEE ON FRUIT AND FRUIT CULTURE.

BY J. F. BOYER, *Chairman.*

By reason of the State not providing as much as blank inquiries to send out to every county of the State, your Committee has thus been disabled from getting the desired information and consequently the facts here revealed are from the central portion of the

State. Inasmuch as the Horticultural Society met at Lancaster the previous week, the Chairman of that body having been provided with blanks already alluded to, has thus been enabled to make such a very excellent report of conditions and the fact that that report is recorded in the year book would suffice.

Your Committee would say, however, that the season just passed has been a very remarkable one. The beginning of January, 1907, had almost summer temperature, followed by severe cold weather conditions thus destroying canes of nearly all varieties of raspberries and blackberries and consequently the smallest crop of same for a number of years. Cherries, also, were an entire failure. Pears, only about 10 per cent. of crop. Peaches, in hands of experienced manager on properly selected soil and location, brought forth full crop while thousands of trees not so situated failed to produce even a partial crop. Strawberries; the same can be said as of peaches, from no crop to full yield. Continued low temperature and excess of rain during early part of summer are chief reasons of strawberry failure.

Apples. The yield of this fruit was a full crop in many parts of the State and the qualities good.

It may be safely said that Pennsylvania is not realizing the full measures of its opportunities as a fruit-growning state, with a variety of soil and climate adapted to almost every kind of fruit that can be grown in the Temperate Zone. Why should this be so?

Notwithstanding the glowing reports of the rapidly increasing wealth of the country, the fact remains only too glaring that a majority, at least, of our fruit growers are not at this day in enviable circumstances. Is it because we have not had time and opportunity for developments? No. Is it because we have repeatedly been visited by unfavorable seasons or discriminating circumstances? Is it because our people have been unthrifty and slow, unwilling to work, or extravagant in their living? No. Is it because thousands upon thousands of acres of land have been set in fruit trees, that was not adapted to fruit so set and no attention paid to varieties? Friends, I believe we struck the keynote.

True, we have some individual planters, especially of peaches, who for years have made a specialty of this fruit and have realized handsome profits, but the so-called peach belts have had their rise and falls, and to-day I doubt whether Pennsylvania has 50 per cent. of the peach trees it had ten years ago. Thousands of trees planted never became of bearing age or produced enough fruit to pay the nursery bill. We admit, in these days of narrow margins together with endless pests and diseases, our orchards will succumb quicker or bear less negligence than heretofore. We have also learned that arguments may look reasonable upon paper or sound logical from the platform, but we all know that theory is as worthless as a rope of sand unless it is backed by experience. At the present day an inexperienced man is as much out of place on a fruit farm as a diamond on the nose of a razor-back hog.

With the rapid increase of orchard pests and unfavorable fruit seasons, many of our fruit growers abandoned the idea of growing fruit, and are now falling back to former occupations. Therefore is left a class of fruit growers in Pennsylvania to-day that have stood the test. They are a class of people that have borne and can bear reverses physically. Were it not for this class of people, fruit growing in the State would be wiped out of existence.

This report would be incomplete without reference to a class of fruit growers in this State who laid the foundations of fruit growing, whose followers are dropping out as fast as they dropped in. The former need no encouragements. They are born and raised on the farm and their education is backed by experience. Neither will they be discouraged or encouraged by theoretical arguments.

How many of our so-called scientific men walk along the shore of the great ocean of horticultural truth and only here and there pick up a pebble, while many a man not known as such is actually picking them up in such great numbers that he who could stand on the pyramid of this grand and noble State and view this country, would find the glitterings of pebbles as numerous as the stars in the heavens.

The CHAIRMAN: You have heard this report, gentlemen, what disposition shall be made of it? What is your pleasure?

MR. HUTCHISON: I move it be received and placed on file with the proceedings.

This motion was properly seconded, and the question having been put, was agreed to.

The SECRETARY: Will you allow me to make a remark? Just now the gentleman who has just read this report made mention of the fact that the State did not furnish any blanks to send out. Now, it is not supposed that the State will follow any stereotyped form, but I wish to announce now that if any of the gentlemen of the Standing Committees will indicate the questions they want to ask, we will be glad to prepare them.

The CHAIRMAN: The Chairmen of the Standing Committees will note this remark, and govern themselves accordingly.

We will now listen to Mr. Cowan, while he tells us of the "Possibilities of a Small Dairy."

## POSSIBILITIES OF A SMALL DAIRY.

BY PETER B. COWAN, *Brookville, Pa.*

These few remarks at this time are from the farmer's standpoint and not from the dairyman's. By the term, dairyman, I mean those who are in the business as a business and not as a sideline, like the majority of farmers. There are thousands of farmers all over this great Commonwealth who keep a small dairy, consisting of from two to four cows, solely for home consumption, and few there are who produce enough beyond the home needs to make it attractive from a money point of view. In my judgment there is no one thing more responsible for the boys and girls leaving the farm than the improper handling of the small dairy, with the unsanitary surroundings of the stables, the ill-kept condition of the cows, the inconveniences for handling the milk and butter; the lack of system and the scanty returns, are enough to cause any ambitious boy or girl to desire something more pleasant and remunerative. Go with me, if you please, and view the surroundings of the small dairy, and see the large per cent. of them that are not the most desirable place to eke out an existence. My observations, when coming in contact with these surroundings and conditions, have led me to the thought of the possibilities of the small dairy. Most of our lectures and literature on the subject of dairying treats of it as a separate business, with all the modern improvements for handling the products and the improved methods of feeding with the silo attachments, etc. There is no question of the good they have done when we look at the advancement along the various lines of dairying, but with the small dairy these improvements are slow to be adopted, and it is a question whether the adoption of many of them would be advisable or profitable to the farmer keeping from two to four cows.

The farmer should aim to make the most out of everything and to have his labors bring him good returns. He should also aim to have all the conveniences necessary to make the labor of himself and family not only pleasant but profitable, and nowhere is this more true than with the small dairy.

The small dairy has many advantages to recommend it if it is properly handled. Among them, is the possibility of doing away with the middleman's profits, by selling the products direct to the consumer. This may not always be desirable or possible, but in a very great majority of cases it is. This plan not only brings the producer in touch with the consumer, but gives him a chance to cater to his tastes and thus remove any undesirable traits in his products. I firmly believe that no middleman can accomplish as much in this direction as you can yourself, but he may, unintentionally, do you and your products a vast amount of injury by placing them where they will come in contact with articles which will contaminate them. Go, if you please, into almost any store where they handle dairy products and notice how butter is displayed promiscuously around the storeroom and on the display shelves along the street, coming in contact with the odor arising from decayed vegetables of all kinds, fish, fresh and salted, smoked meats, cheese, lamp oil, and sundry other articles, the flavor of which is not desirable in the products of a well-managed dairy, large or small. After a scrupulously clean and careful butter maker has prepared a gilt-edged article and taken it to the store, it is too often either placed in a case with a lot of off-flavored butter or permitted to set around the storeroom, which is too often filled with the fumes of tobacco, and when the purchaser comes along he is told that this particular roll of butter was made by Mrs. Smith, Jones or Brown, as the case may be, and the consumer finds, to his sorrow, that this particular butter maker uses peculiar flavoring in her butter, not to his liking and over which the producer has no control.

The Pure Food Law says that the dairyman must practice approved, sanitary conditions when producing an article which is placed on the market, but it does not offer any protection from the above abuses of their products after they have left their hands. It is possible for the small dairy to remove and overcome, in a large measure, these conditions, by placing their products directly in the hands of the consumer, and while doing this have the benefit of the middleman's profit. It is also possible to maintain a more uniform price, for it is not unusual for the storekeeper or middleman to have two or three different prices in a single day, varying from two to ten cents, and often fifteen cents per pound.

In order to get the best possible results eternal vigilance in regard to cleanliness is absolutely necessary. Do not think for a moment because you have a few private customers that they do not know when they get a good article, for they do, and they will very quickly detect any change in conditions, whether good or bad, notwithstanding the oft-repeated remark that people get used to a certain make of butter. You will sometimes find those who will be harder to please and more exacting than if they bought the same of a poorer grade of goods at a store, but persevere and continue to improve, not only the quantity of your goods but the quality, for the number of careless, indifferent dairymen and dairywomen will always assist in furnishing a market for the better grade of goods, and a very large proportion of your customers will approve and highly appreciate any improvement in the quality of your products.

You will notice that I have kept in view the marketing of the surplus of the small dairy, for I believe it is possible for every dairy consisting of two or more cows, to produce enough beyond the home needs to not only supply a few private customers the year round, but make the income therefrom vastly profitable, both to the farmer and his family. Not less than two cows must be kept if you desire the best results, and as many more as your help will warrant you to keep. It is possible to make this small dairy pay in cash returns, or its equivalent, handsome profits, and if the different products are properly handled and marketed it is possible that they will return you One Hundred Dollars per cow. I am well aware that this assertion will be looked upon with considerable doubt by many farmers who keep a small dairy that produces scarcely more than enough to supply the home needs. To arrive at the possibilities of a small dairy it is necessary to pay the same attention to little details as the larger dairy. It should be arranged so as to have the cows fresh at the right time to bring the best results. This is not a visionary dream of the writer, for he has proven the assertions to be facts in his own experience.

A few years ago when the help question became a serious problem and it was necessary to reduce our operations on the farm, we debated the question as to keeping any cows at all if we could buy the produce needed for the same money as it would cost to keep two cows. A little figuring showed that we could do so and thus save the labor of caring for the cows, but we were confronted with, to us, a more serious problem than the caring for the cows, and that was, where to get a desirable article of butter, cream or milk, and it was decided that we would have to keep the cows ourselves if we expected to be supplied with the kind of products we desired.

Then this question confronted us, is it not possible to make those two cows (for that was all we thought our help would justify us in keeping), pay us a good return for our labor over and above their cost of keeping. We have succeeded in solving the problem, and are well pleased with the results, although not satisfied that we have reached the climax of the possibilities of a small dairy; our cows, as well as other conditions, can be improved. We let the dairymen select what they wanted and we kept the culls, but as we had been breeding dairy types, the culls proved to be fairly good, but it took us some time to get them to bring about the best results. We retail all our products to private customers, and try not to have more customers than we have products so that we can at almost any time furnish an extra pound or two of butter, or a supply of cream, skim milk, buttermilk or cottage cheese, for we find it more profitable to vary our production than to depend altogether on the sale of butter. If butter is scarce and high we try to have plenty for all needs; if it is plenty, and the price low, we try to increase the other products and thus cater to the desires of our customers. We do not have a fixed price for butter, but vary with the markets, only we never come below twenty cents per pound, no matter what the store sells for. Our breed of cows are very sensitive on the matter of price and positively refuse to compete with those cows that produce shilling and ten-cent butter. The other products have a fixed price the year round, and thus we have an advantage by increasing these sales when butter is low.

We try to have our cows freshen at periods that will insure us a constant supply of products for all our needs and bring us the largest returns. We keep these two cows as a necessity to supply our home needs of milk, cream and butter, consequently, we use all of these in the home that is desired and the surplus is what we sell; we have never yet gotten into the custom of selling all the cream and using the skim milk at home.

I will now give you some figures for 1907 to show the possibilities of a small dairy on our farm:

| | |
|---|---|
| Received from the sale of butter, | $103 00 |
| Received from the sale of cream, cottage cheese, skim milk and buttermilk | 89 02 |
| Received from the sale of veal, | 24 09 |
| or a total of | $216 11 |

When we see that the home consumption is equal to the cost of the keeping of these two cows, we consider this a very creditable showing and feel that we are amply repaid for the labor expended.

We are sometimes asked if it is not a considerable task to market this small product every week. In answer we say, "No," for while we are marketing the products of the dairy we try to have other things to market at the same time, all of which we retail to our customers. We very rarely go to market with dairy products alone.

The CHAIRMAN: You have heard this paper, gentlemen; what shall be done with it?

MR. HUTCHISON: I move it be received, and placed on file.

This motion was properly seconded, and the question having been put, was agreed to.

The SECRETARY: I suggest that there be a recess of five minutes, to allow the next speaker time to put up his charts.

The CHAIRMAN: We will take a recess of a few minutes until the gentleman has his charts arranged.

After an interval of five minutes Mr. Blyholder again took the Chair.

The CHAIRMAN: The members of the Board will please take their seats and prepare to listen to the next speaker. The subject is "Growing Beef," and I take pleasure in introducing to you Mr. Bradfute of Xenia, Ohio.

The following address was then delivered:

## GROWING BEEF.

BY S. E. BRADFUTE, *Xenia, Ohio.*

Gentlemen of the State of Pennsylvania: Perhaps some of you may have heard me discuss this subject somewhat along the same lines before the Livestock Association at Pittsburg, when the meeting was held in that city. I shall perhaps treat the subject a little differently, as we are constantly trying to improve along these lines.

In the splendid address to which we listened this afternoon, we learned that the American farmer is not succeeding in getting the yield per acre of grain that the farmers of other countries are doing. I think we are all satisfied that this is due to the fact that the American farmer has been doing entirely too much skimming in his process of farming. He has skimmed lightly over the soil, drawing out its fertility and then gone farther west and repeated the process, and then going west and going west. That is not only true of the grain growing districts of America; it is also true of the beef and cattle industries of America. Well do I remember of often hearing my grandfather—you see my family have been interested in the growing of beef in the same territory for nearly a hundred years—often have I heard my grandfather talk of feeding his steers and driving them over the mountains to Philadelphia and Baltimore. Of course, that part of the business has long since gone. The steers that was grown then was, of necessity a strong, vigorous, bony fellow, that could stand the strain of traveling for days without losing too much flesh, rather than the one we want to-day of less bone and more meat. The larger part of the cattle men have drifted west, because it was easier to grow cattle, the same as it was to grow wheat. As the grass disappeared in one place he drifted further west, and still further west, until to-day the cattle grower has practically come to a stand still in that direction. It has, in my judgment, practically reached a stand still, and the large tracts that were once the grazing ground of the cattle are being cut up into smaller farms. We find the people that have been doing this, returning from the west, returning from the skimming process, to the east, and beginning to do things right. And I predict that the same thing will occur in our cereal growing. We will have to do things, and do them right. Now, the very fact that he had these large ranches in the west to compete with, made the man who would grow in the east, produce a better article. If they in the west could grow quantities which we in the east could not reach, then the only thing left for us to do was to grow a more approved quality, one which was in demand. The time was when they raised steers to weigh from eighteen hundred to two thousand pounds, but to-day that is not done in this country; the steer that is most in demand is the one weighing from twelve to fifteen hundred pounds, and it would not be objected to if he did not weigh over twelve hundred pounds, if he reached the market of sufficiently high quality.

Now, the question arises here as to whether or not there is any chance of financial success in breeding to these ideals in this country, and I have some facts here that were furnished by the Chicago market; I have taken the Chicago market because I know more about it than any other market, and because they handle more cattle there than they do in the Eastern markets. The last five years preceding this one, the average price of the steer brought from the west, and sold in Chicago, up to the weight of fifteen hundred pounds has been $6.03 per hundred. On the other hand, the average price of steers weighing nine hundred pounds, that have been sold in Chicago—of course, that includes some of the very inferior class—and a great number of the feeders weighing up to nine hundred—those weighing nine hundred pounds have averaged $4.40 per hundred, a difference of $1.63 per hundred, or 27½c. of each hundred pounds that is added between the nine hundred and the fifteen hundred pounds. Now, that does not always prevail, but it is a voucher we may use in arriving at a conclusion that it would pay us to feed the steers heavier than we have done up to fifteen hundred pounds. That is, we have 27½c. for each hundred pounds again. We can be pretty sure with this to go on, but in order to make sure that there may be no mistake, we will go a little further, and we find that for the past fourteen years, the average price of the fifteen hundred pound steer was $5.51 per hundred, while the average price of the nine hundred pound steer was $4.25, a difference of $1.26, or 21c. for each hundred pounds higher.

I think we can safely say, therefore, that there is a gain of over twenty cents for each hundred pounds that we put on the steer. Now, it sometimes happens that if the steer is of sufficiently high quality, that a low weight steer will sell very close to, or even sometimes in advance of the heavier steer, and I wish here to read a short article from a Chicago paper, "The Stock Yard," of last Friday, which will give you some idea of the present market, and the indications that are held out:

"Basing on supply and demand there will undoubtedly be an excellent market in the present year for finished stock especially choice quality, and it is quality that counts, as for instance this week, two lots of over one hundred and sixty head of fancy 'fully matured' 1038 pound and 1185 pound yearlings sold at $6 and $6.25 respectively while poor quality and poorly finished 1000 to 1200 pound 'so-called' fat cattle sold as low as $3.60 to $4.00. But, then again, comparatively few even 'fair kind' of killing steers sold below $4.75 while a number of choice 900 to 1100 pound 'well finished' yearlings, including steers and heifers mixed, went at $5.00 to $5.75. On the other hand choice 1500 to 1600 averages sold at $5.75 to $6.10, with a 'sprinkling' at $6.15 to $6.25, but these prices will undoubtedly look low after a while, unless all signs fail."

The point I wish to make here is that we have reached the time when the Eastern farmer must be upon the market with choice 1200 pound steers, that will sell as high or higher than any other steer that can be grown. Now, if we are going to grow 1200 pound steers, I think we should establish pretty clearly what kind of a steer that steer must be. That steer will not be one that has come from a cross between some beef breed and a dairy breed, nor will he be a steer that is made up of some dairy breed. He will be a steer of a pronounced beef breed. He will be a steer possibly—probably of one of the three or four great beef breeds. If not, he will have a large percentage of the blood, and at least one or two crosses of the best beef breeds. I am not here to advocate any particular breed of cattle. I care not what the breed is, so that the animal is made right, and is of the right stamp, and has the right standard. There are four or five good beef breeds, and any one of them will make a good beef steer if fed right, and I will say that with the particular breed a man likes best he will succeed best. All things being equal—I would prefer him to be hornless, because it aids largely to safety in handling him. I think I hardly need describe to this audience what this steer should look like. He should be well built and he should be compact, pretty close to the ground; the closer the better; I have never seen one too close to the ground; the bone and the muscle should be fine, and he should be well rounded out. His back should be especially good. He should be wide across the shoulders, and wide behind the shoulders, and wide all the way back. The shape of the back should be arched, like this, not hollow, like that. Frequently you will see the back of an oval shape, and when you see in a steer that is broad in the back, a tendency to let the back down, I would rather see it than have the back up. Then I want the hind quarters well rounded out, and well built, and then I want a nice head on this steer. A nice head. I have heard a good many old fanciers say that if they saw the head of the steer coming round the corner of the barn, they could tell the character of the steer from it. I don't doubt it, and I have no doubt that there are men in this audience who can say the same thing. It should be remembered that the short head means an easy feeder. The long headed steer is not an easy feeder. Then I want quality, and I want a steer that is full of quality. I never heard anybody who could define what quality is, and do it well. Quality is one of the best things you can have in a steer. When a steer is easily finished and you can see the muscles stick out over the fat when he walks around you, when he is well rounded, and firm, not too firm, but just firm enough, he has quality; you can't tell just what it is; you must see it, and become acquainted. It is one of those things that when you see a steer that has it, it will almost make the saliva trickle the side of your mouth. You can almost taste him. That is quality. It is going to do something; it is going to make something; and that is the kind you want.

And then you want a gentle steer. I have no use for a wild steer, and still less for a wild man to feed him. You want him quiet and gentle, and well acquainted with you, so that you can go up to him at any time and put your hand on him. I am not talking about ranch cattle, but about cattle in Pennsylvania. I want that steer to be gentle, so that you can go up to him, and he knows that you are his friend, and he recognizes you, and knows that you will do good things for him if he gives you the chance, and will do good things for you.

Now, I have described some of the things I want. I have a picture here that is perhaps not one of the best. I have never been able to get an artist to make one that I consider quite right. Another thing: I have never been able to produce a steer that is quite right. A man who can produce something that comes up to his ideals is apt to have rather low ideals, and will never see very much to improve. I want his ideal to be so high that he cannot reach it. In the second cut you will notice that we have this steer cut up as we would have him cut up in the eastern market. You will notice the one thing to which I want to call your attention, and that is, that the valuable meat on that steer is with one exception, along the centre line, and is between the word "chuck" and the word "rump" practically. In other words, two-thirds of the value of that steer lies in one-fourth of his carcass. Now, I said to you that it was necessary to have a good back, and it is necessary, because, as you see here, two-thirds of his entire value lies along his back, extending slightly down to the sides. Now, then, those of you who are acquainted with the dairy cow, will understand why the dairy back—the wedge shaped back—means that you do not have the back on which to build a beef steer. I am not here to say that you cannot take the dairy breeds of cattle, and make as many pounds of meat from them. I am not here to say that, but I do say that you cannot make as good a showing for the amount of feed they have received—perhaps good feeders can do it, but I am here to say that when you get these pounds, you have not got them in the right place. You have not got them in the one quarter of the back lines that will produce the best value in the beef steer. And when you have the necessary fat on the dairy animals, you have not got it in the form that you want it. You have the fat outside, and the lean inside, whereas you want it marbled, a streak of fat and a streak of lean, and this you cannot get in the dairy animal. At least, I have never seen it, and I have seen a good muy of them come up. You cannot get it marbled; you get the fat on the outside, with the pure lean meat between. That is the reason the beef man will not buy the dairy cow. He will have to sell that meat at a lower price if he handles it at all.

Now, that we know the right kind of a steer, and the kind of a steer we want, how are we going to get it? A great many of you will want to grow him from calf-hood, from start to finish, and if so, you will want to begin much farther back than that. You will notice that in the human family, certain families of men are inclined to be fleshy. They don't eat any more than the lean fellows do—sometimes not as much, but they are fleshy. The same thing is true in animals. They run to flesh, and they do it on less feed than some of the others. While I admit that you might be able to put this flesh on the dairy cow, I contend that you can do so on the beef steer with less feed. If you are going to start in with the calf, I should like that calf to come in the fall of the year—in October or November. There are two or three reasons for this. True, you will have his dam to keep during the winter, but I am going to suppose that he is going to nurse his own dam. If he cannot do this, and you have milch cows, take them, and give him the warm milk, and you may raise him in that way; or, if he cannot nurse the cow, simply give him milk that has been warmed, and you may raise him that way, but in my judgment you cannot raise him as well as if he nurses his dam, or some other good milch cow. So far as I know, there is only one thing that is better for the calf than milk, and that is more milk. I have never given the calf after he comes and learns how to handle it himself, any help in feeding. I like to have him go in the barn at the start; it gets him used to it—and you Pennsylvania people have good barns—and you can be with him every day, and he becomes accustomed to you, and becomes gentle. He becomes accustomed to watch you, and you can see what he is doing. After he gets so that he can eat, I like to give him a little shredded corn on a shelf where he can easily reach it. If there are three or four of these little fellows together, all the better. I give them just a table spoonfull or two, for the three of them, and then let them nurse twice a day. You will find that the cows are much easier to milk afterwards, and will give you more milk, if you keep her in the barn, and let the little fellows go in there morning and evening and nurse. If you let her go out in the pasture with him, she will run, and half her milk will be wasted, and she will not do so well afterwards.

Then I would like these little calves kept in a nice, roomy, light pen, not back in the dark. Then he should take water often, and go out every day. It cannot hurt beef cattle to get out into the air. In fact, the finest cattle we have, the International Prize Cattle, spend most of their time outside in the air. I believe that one of the troubles of tuberculosis cattle is due to the fact that we do not allow them out in the air enough. This pen should be light and airy. Then let these little fellows get on as quickly as they can. It should be thoroughly understood that the first five hundred pounds is the cheapest you put on him, and the second five hundred is the second cheapest, while the last five hundred pounds is the highest priced of all. Now, when he comes in the fall, he really does not cost much besides his milk; perhaps it costs a little more to feed his mother, but your calf gets very little high priced feed. Then when spring comes, you find him ready to go out to pasture, and feed himself on grass. The second six months are the second cheapest, because he will be ready to feed himself in pasture. If he comes in the spring, the first six months he feeds on milk, and the second six months he feeds in the barn on the highest priced feed you can give him— the protein. So I would say that the first thousand pounds, which he will weigh in possibly twelve months, probably fourteen or fifteen, are the cheapest if he is born in the fall. In my judgment, the calf that comes in the fall is the cheapest calf.

Now, again, in the growing of beef cattle, it is not necessary to have a closed barn, such as you must have with dairy breeds, as many of you know. After my calves are six months old, or more, I would prefer to have them in a pen open toward the south; closed on three sides if you can have it that way; and then have them feed right out there in the pen. This is the ideal way, in my judgmen, to feed steers right out there in the pen. If that calf has any particular trend, you can see it, and will soon learn to know it, and as a matter of fact, that calf will probably be what you make him the first six or eight months. I do not believe it necessary to carry stockers. You hear it said that it is, but I do not agree with those who say so, and after all, you simply have their word for it. You do not want an animal that does nothing. You want a steer that will be born to-day, and go to work to-morrow, and work until he goes to the block; then you have a steer that is doing something for you. That is a steer that is worth having, and when you see one that can not do it, the sooner you get rid of him the better it will be.

Now, I think that one of the troubles in the steer feeding business is that we have been practicing too much the teaching of critics, and following experimental methods. A few years ago it was declared the way to feed steers was to husk the corn, and then buy some high priced feed to mix with it, and go to a whole lot of trouble and expense. It can be done and it will make good steers. There is no doubt about that. I think, however, that you will find conditions here very much like in the west,—that it costs money to husk the corn and grind it up and feed it to the steers. It is adding about one-third of the cost of the corn to it, and you do not receive anything like one-third more value in results. Indeed, it is not shown that you have added much to the feeding value, if anything. I remember distinctly, some six or eight years ago, advocating the return to the older and simpler methods before the Illinois Live Stock Breeders' Association, and I don't know when I have had as brisk a currying down as I received there that day at the hands of some of those—what shall I call them, scientific farmers?—if these learned men here will pardon me, I will let it stand. They said it was too much like an old fogy way, but I want to say to you that the Illinois Experiment Station has been following some of these methods, and they have found out that the old fogy ways were the best after all. They found they did not get any better results by feeding broken corn than they did by feeding in the old fashioned way, the corn in box with the fodder. I admit that you will gain a little more, apparently by the other method, but if you will follow out the case, you will find that in the end you have lost especially when corn is not too high priced, and even with corn as high as it has been this year, it is poor economy, in my judgment, to grind that corn and shred that fodder. You must remember it takes time to feed in that way, and then it costs to get the corn ground. With us it costs 5c per hundred. Then you have to add the cost of the machinery. At least this is the case with us farmers in Ohio, and I don't think it is different in Pennsylvania. So I don't think they can establish that it pays to feed cattle in this way, or that it is a better method than feeding the cattle in open pens where the man can watch them feeding, and become acquainted with them.

To the man who goes into the work thoroughly, and right, there is money in cattle breeding. I would not advise the theorist to try it. Theory does not achieve the same results as hard, practical work and knowledge. If you are in the work for success, and are willing to work for it, success will come to you, if you like the work. I don't believe that any man succeeds, as a rule, in a business he has no liking for. There should be a natural liking for the business, and a determination to succeed. Then he will set out and experiment and improve, and he will keep a record of his methods, and when he has found one that succeeds with him, he will keep it. Now, there are many small farmers in Pennsylvania, as in Ohio, where it seems strange to me that a man does not keep a few beef cattle round his farm. There is always a good deal of feed around the farm that is of no particular value, and which these cattle would thrive on. Out in Ohio this year, for instance, we have a good deal of soft corn, for which there is no market, but beef cattle will eat it, and put on flesh on it. Now you may not get quite as good a gain on it, as on the other kind, but it would be a waste to you, and they put on flesh, and thrive on it. Now, you will have something like that every year, that will practically go to waste on the farm, that he could turn into a few beef cattle, raising four, or five, or six of them, that would bring in a nice return. And in connection with these beef cattle, it is well to keep a few hogs, which can be fed on the shocked and broken corn that would otherwise go to waste, and in figuring the profit on your steers, it is also necessary to include the profit on your hogs.

Now, the question is often asked, "Can you give us facts and figures to show this?" and I will say to you very frankly that I am not prepared to do so, but I can refer you to a lot of men who are making money by these operations, and I can refer you to a lot of farms that are getting rich by this process, not simply holding their own, but getting rich. I said to you earlier in the evening, that we have skimmed the surface of our farms, and gone west, and gone west, and gone west. Now, we have got to come back, and put back into our ground some of the richness we have skimmed off. Now, we have to put the fertility back to our land, and if you are going to grow grain there, there is no better way than by putting on that land some live stock. Nothing better has been found. Now, if you are a dairyman, well and good, but if you have no dairy market, and need to fertilize your land, I know of no better method than to start in beef growing; it is one of the best methods of fertilizing and improving farms that can be found.

Now, I want to say only one other thing. If you start in the cattle growing business, you will naturally want high class stock, and the man that is a success at growing beef cattle, or cattle for any other purpose, will usually be a high class man. If you see a high class animal, you will see a high class man round somewhere; he will be a success, and he will breed the best animals that can be put on the market, and he will know his business.

PROF MENGES: I would like to ask the speaker a question: I know a number of men who have started in the production of what is called "baby beef," and they are doing it along with the dairy; they use the butter out of the cream and sell it, and then they raise this "baby beef" on the skim milk. Now, they are inquiring as to the best kind of feed to supply that butter fat that has been taken out of the milk. Have you had any experience in that line?

MR. BRADFUTE: No; I have had no experience in that line at all. Our whole experience has been in allowing the calves to nurse their dam, but I know it has been done, and I think they use oil meal; in fact, I think it is better than anything else I can think of now.

PROF. MENGES: The reason I asked the question is, that quite a number of farmers in this section, especially in York county, instead of feeding their cattle all winter, have been looking toward the production of this kind of beef, and they have been feeding the calves with the milk after the butter fat has been taken out.

The SECRETARY: I have noticed that they will eat a lot of corn, and thrive on it.

PROF. MENGES: We have not found that quite satisfactory.

A Member: I would refer the gentlemen to Dr. Frear of State College. He can probably tell you.

MR. BRADFUTE: I might say, Mr. Chairman, that in our experience—and I might add that we have had quite a number of cattle take prizes at the International shows—in our herd of cattle we have quite a number of nurse cows. It is necessary for us to have them in taking our cattle to these shows at Chicago. I have noticed however, that it is not necessary for these cows to show a high percentage of butter fat. In fact, we take what you might call the cheese cows. We feed them shelled corn—just the corn and oil meal. We never begin feeding a calf under fourteen days of age. It is dangerous, I think, to feed them earlier than that, because I think they are not prepared to take care of it. Their stomachs are not in condition. I keep them entirely away from the feed until they are at least fourteen days old, and leave the mother out, after a few days, an hour or two at a time, lengthening the periods until the calves are fourteen days old, then the mother can come in at night and the calves can begin to eat, but as to taking all the butter fat out, we have never done it.

PROF. MENGES: These men have obtained the best results in feeding oats and corn-meal.

MR. BRADFUTE: I would rather feed them the whole corn, because I don't like to deprive the calf of the pleasure of grinding that corn. He has the machinery, and I therefore, don't think it right to deprive him of the pleasure of exercising that machinery.

The CHAIRMAN: Anything further on this subject? If not, are there any announcements? If not, gentlemen, I would ask you to be prompt to-morrow morning, so that we can begin our session at the hour stated, nine o'clock.

The meeting now stands adjourned until nine o'clock to-morrow morning.

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Thursday Morning, January 23, 1908, 9 A. M.

Mr. Hutchison in the Chair.

The CHAIRMAN: Gentlemen, you will please come to order, and we will take up the work of some of these Committees. We will have the report of the Executive Committee, if Mr. Snavely is ready.

MR. SNAVELY: Mr. Glover has that report, and he is not here just yet.

MR. BLYHOLDER: I desire at this point to make an announcement; I stated last evening that I would appoint the Memorial Committee a little later. I now wish to state that I have selected for this committee the following gentlemen: J. A. Herr, Matthew Rodgers and J. Newton Glover.

The CHAIRMAN: Is there any other Committee ready to report at this point?

None of the Special or Standing Committees appeared to be ready at the moment.

The CHAIRMAN: Since there are no reports we will take up the first subject on the program this morning, the report of the Ornithologist, Dr. Surface.

## REPORT OF THE ORNITHOLOGIST.

By Prof. H. A. Surface, *Harrisburg.*

During the past year the correspondence by your Ornithologist, concerning birds by which was directly traceable to his position with this honorable Board, has not been very great, but the correspondence and receipts of specimens of birds in his office of Economic Zoologist has been considerable and worthy of note here. The list of specials of which specimens were received or inquiries made during the year 1907 is as follows :

American Bittern—2 specimens.
American Goldfinch or Thistle Bird—1 specimen.
American Goshawk or Northern Hen Hawk. Several specimens received last fall and before that time practically none received. This shows there was then a flight of them to the South.
Barn Owl—1 specimen.
Brunnich's Murre—1 specimen.
Birds—Notes on Arrivals. Observations. How to Preserve Birds. Foreigners shooting birds. Not killed by spray liquids. Fall migrations.
Blackbirds, injuring English Walnuts. How to get rid of Blackbirds.
Bluebirds—4 specimens.
Blue Heron—2 specimens.
Bluejays—4 specimens.
Broad-winged Hawk—1 specimen.
Canary—1 specimen.
Carolina Rail—1 specimen.
Catbird—2 specimens.
Cedar Bird—1 specimen.
Cedar Waxwing—3 specimens.
Chickadee—1 specimen.
Chipping Sparrow—3 specimens.
Crossbill—6 specimens.
Crows—8 specimens.

Dipper—1 specimen.
Duck Hawk—1 specimen.
Eagle, Bald—1 specimen.
English Sparrow, suppression of—2 specimens.
Flicker—3 specimens.
Grebe—1 specimen.
Grebe, Horned—2 specimens.
Green Heron—2 specimens.
Grosbeak, Cardinal—1 specimen.
Grosbeak, Pine—4 specimens.
Hawk. One specimen killed 19 birds. Protection of Hawks. Specimen in Barn.
Young Hawk—1 specimen.
Hawk, Cooper's—1 specimen.
Hawk, Red-shouldered—4 specimens.
Hawk, Red-tailed—1 specimen.
Hawk, Sharp-shinned—5 specimens.
Hermit Thrush—1 specimen.
Hooded Merganser—1 specimen.
Junco or Snow Bird (Slate-Colored Junco)—1 specimen.
Kingfisher—1 specimen.
Lark, Meadow Lark—1 specimen.
Logger-headed Shrike—1 specimen.
Long-eared Owl—1 specimen.
Marsh Hawk—2 specimens.
Maryland Yellow-throat—1 specimen.
Murre—1 specimen.
Night Hawk—1 specimen.
Nuthatch—1 specimen.
Oriole—1 specimen.
Osprey—1 specimen.
Oven Bird—3 specimens.
Owl, Screech—2 specimens.
Owl, Grey Screech Owl eating a White-winged Crossbill—2 specimens.
Owl, Great-horned; this species devoured a Screech Owl. Protection of—3 specimens.
Pheasants, Breeding Meal Worms for Food of—1 specimen.
Owl, Barred—1 specimen.
Pigeon, Wild, inquiries concerning.
Red Bird.
Red-breasted Merganser.
Red-winged Blackbird—2 specimens.
Robin feeding upon Cutworms—1 specimen.
Robin charmed by Blacksnake.
Rose-breasted Grosbeak—1 specimen.
Ruby-throated Hummingbird—2 specimens.
Sapsucker, Red-headed.
Scarlet Tanager—2 specimens.
Short-tailed Shrew—2 specimens.
Song Sparrow—5 specimens.
Sparrow Hawk—3 specimens.
Sparrow, Java.
Vesper Sparrow—1 specimen.

Whip-poor-will.
White-breasted Nuthatch—1 specimen.
Woodpecker boring in solid wood.
Woodthrush—1 specimen.
Wren.
Yellow-bellied Flycatcher—1 specimen.
Yellow Warbler.

Our records show that there were several specimens of the American Goshawk or Northern Hen Hawk received last fall, and before that time there were practically none. This shows that there was a southward flight of them from the northern counties which they inhabit and where they breed and spend the summer. This is one of the birds that is not protected by law in Pennsylvania, although it is rare and only a winter migrant.

We have received further reports concerning Blackbirds injuring English Walnuts by puncturing them while they are soft and growing upon the trees. As reported last year, their purpose in making this injury is not known to us.

A great deal of our correspondence has been upon the subject of the English Sparrow, due to a bill introduced in our State Legislature by Hon. William Barnhart, providing for a careful and accurate investigation of the economic features and habits of this bird and the methods of destroying it if found advisable, and the publication of a special bulletin upon this subject, also appropriating one thousand dollars ($1,000) for this purpose. It is thought its failure to pass the Legislature was due to the provision calling for "investigations" of the Sparrow, thus giving him a fair chance to be tried. It is our opinion that had it called for the extermination of the Sparrow, it would have received favorable action by the Legislature, but the important question would then come as to the methods of exterminating the English Sparrow in a way that would prove safe, effective, and not too expensive. Various methods would have to be devised and tested, and we fear that after all is said and done we must acknowledge the presence of this nuisance of the feathered tribe as a necessary evil that can not be abated.

One correspondent wrote us that he had succeeded in poisoning the English Sparrow and destroying it in his region by the use of poisoned millet seed. He fed the birds on untreated seeds until they became accustomed to them,and after a few days soaked some millet seed in water with a very slight touch of strychnine added, and then dried them and mixed one part of these poisoned seeds with nine parts of unpoisoned seeds. The birds ate this mixture without suspicion and were killed by it. He said he found wheat grains too large to be readily swallowed by the English Sparrow without it having to taste the bitterness of the strychnine and become suspicious of the material as a food. This is a suggestion worthy of the action of persons desiring to kill the English Sparrow and thus avoid loss by its ravages and driving away our native birds. It should be remembered that poisoned grain of any kind must be placed where it will not be found and eaten by poultry.

The last Legislature also saw the introduction of a bill providing for making the Flicker a Game Bird. This was championed by a representative from one of our eastern counties, but upon the appearance of your Ornithologist before the honorable Committee on Agriculture, by invitation of said Committee, and his speaking in behalf of the Flicker, showing that it is a beneficial bird and should be preserved, the bill fortunately died in committee.

The Screech Owl fortunately is becoming more abundant in some portions of our State, as popular sentiment is increasing for its protection, and it is permitted to nest and remain in hollow trees and posts and other available places in boroughs. As it increases in number the English Sparrow and mice, upon which it chiefly feeds, decrease perceptibly. We have recently had a very gratifying report from Coatesville, Pa., confirming this statement. The Screech Owl is among the chief enemies of house mice and the English Sparrow, and we hope to see it faithfully protected around buildings and in villages where it should become much more abundant. One of our peculiar records is the finding of a Screech Owl in the stomach of a Great-horned Owl. It is well known that owls are sometimes cannibals.

During last spring we had a very interesting experiment with the Robins apparently pulling cabbage near Harrisburg. The account of this was published in our July Bulletin and attracted a great deal of attention. It is as follows:

## ROBINS DESTROY WIREWORMS.

### Difference Between Observation and Interpretation.

It frequently happens that certain facts are observed definitely and consequently can not and should not be denied, but the interpretation is such that might lead to quite erroneous conclusions, and even evil results. One of the most important duties of the teacher of Nature Study or any branch of Natural History is to give training not only of the minute observation of facts, conditions and phenomena, but also their own interpretation and practical application.

An important case illustrating the difference between interpretation and observation is seen in that of a truck grower near Harrisburg, who recently observed Robins at work in his cabbage field, apparently pulling the cabbage plants in numbers, and he at once shot quite a number of the birds. When brought to trial by the Game Commissioner, he acknowledged having shot the birds because they were destroying his property in pulling the cabbage plants, and testified that he had seen them take the plants in their bills, pull them up and throw them aside. He was not certain that they ate any part of the plant nor anything near the plant, and it might have been thought that they were doing it only for mischief. Doubting such an unusual occurrence as Robins pulling plants for the purpose of destroying them or without some definite and doubtless beneficial end in view, a representative of the office of the Economic Zoologist went with the Game Commissioner to the truck field where the cabbage was growing, and there they saw, indeed Robins in considerable numbers hopping over the ground, and often stopping to pick up objects, and even scratching in the ground with their bills, and then eating something. They were particularly busy quite near the cabbage plants, and a number of plants were seen lying on the ground beside the hills, wilted and dying. A careful examination revealed the fact that the plants had been cut off rather than pulled out, and in at least one case the Robin was seen to throw aside one of these plants, which had been cut off but was yet standing in its hole in the ground. Around the foot of the plants and just beneath the surface of the soil worms were to be found by the hundreds. It was found that the wireworms had cut the cabbage plants, and the Robins were busily engaged destroying these very injurious pests for which there is practically no remedy, after they appear, and of which there are far too few enemies. The facts were that the truck grower observed the Robins at work around his cabbage plants, and perhaps occasionally lifting out some that had been cut off by wireworms, and he jumped to the conclusion that the Robins were pulling his plants, and proceeded to shoot his most beneficial friends. The correct interpretation was that the plants were cut off by pests for which there is no practical remedy at this time of year, and the Robins were feeding extensively on those pests, but as some of the plants remained in the ground where the wire worms were to be found, although cut off and dying, the birds found them in their way and threw them aside. It is doubtful if the killing of the birds was justified under such circumstances, even with the positive and conscientious belief that they were doing damage. It was the duty of the truck grower to ascertain the facts of the case and act intelligently upon them, fully as much as it was his duty or privilege to protect his crops.

Details of the above case are published for the sake of emphasizing the importance of correctly interpretating what is to be observed in Nature, and acting most intelligently and properly. It is generally wrong interpretation of observed facts which leads to the common popular errors concerning Natural History subjects rather than mere fabrication of false belief. For example, the popular erroneous idea that there is a Horn Snake with a poisonous sting in its tail appears to be founded upon the observed fact that the House Snake or Milk Snake has a tail that is rather hard and pointed and from the observation of this, the story of the Horn Snake appears to have grown. It is to be hoped that readers will join in aiding the work of the Economic Zoologist to ascertain and publish the truth in Nature.

There has been a great deal of complaint concerning foreigners shooting birds. It appears that in the Old Country even the smallest birds are shot and trapped for food, and foreigners do not learn to respect our laws in this regard. The Game Commissioner has had a great deal of trouble in attempting to enforce the laws for protecting birds among foreigners, especially in the mining region. His efforts are commendable and good results are seen.

We have received inquiries concerning spray liquids killing birds, and have replied to the effect that we believe this never results. The only way in which poison could be taken or such results could occur would be by the birds eating insects that have been poisoned by feeding upon foliage holding arsenical insecticides or eating poisoned fruits. As birds do not eat dead insects this can not occur as one of the undesirable results of spraying.

Something has been said concerning the introduction of Pheasants in this country. This is commendable and could no doubt be made successful. The Pheasant in its habits can be considered as intermediate between the Ruffed Grouse or our common game bird commonly but wrongly called the "Pheasant" and the domesticated Guinea. It would thrive along the edge of thickets and in partially open pastures, in practically the same places as the Quail preferred when it was abundant in this State. It is a beautiful bird, insectivorous and seed-eating in its feeding habits, and might become one of our important game birds. It has been successfully introduced along the western coast of the United States, and we know of its breeding undomesticated in the State of New York. We would recommend it as a bird to propagate and introduce in this State.

The reduction of the number of Quail by severe weather during the past two years has been quite perceptible. The Quail is one of our most valuable insectivorous birds, being destructive to potato beetles, grass-hoppers and other obnoxious insects. It is also an important destroyer of weed seeds. For this reason we earnestly recommend the endorsement of legislation proposed by our State Grange at its last Annual Meeting, calling for a closed season of five years for the Quail or Bob White.

Concerning the Game Laws of the State of Pennsylvania we should offer a paragraph:

The law at present provides bounties upon certain animals as follows: For each wildcat, four dollars; for each fox, two dollars; for each weasel and mink, one dollar.

We agree with the publications of the Biological Bureau of the U. S. Department of Agriculture, to the effect that bounties are not justifiable, cost too much, and do not bring the desired results. If creatures are sufficiently obnoxious to demand the efforts of mankind in exterminating them this will be done, bounty or no bounty.

All species of birds are protected by law in this State at all times excepting the Bluejay, English Sparrow, European Starling, the Kingfisher, Cooper's Hawk, Sharp-shinned Hawk, Goshawk, Duck Hawk, Pigeon Hawk, Great Horned Owl, Barred Owl, the Crow and the Raven, and the game birds which are to be shot only during their respective open seasons, and which are named by our State law as the Quail, Ruffed Grouse, Prairie Chicken, Imported Pheasant, Wild Turkey, Wild Pigeon, Dove, Reed Bird, Rail, Blackbird, Sandpiper, Tatler, Curlew or any Shorebird, Wilson Snipe (Jack Snipe), Upland or Grass Plover, Coot or Mud Hen, ,and Water Fowl known as Duck, Goose, Brant, Swan and Grebe. We can not see the justification in having the Dove, Blackbird, Coot or Mud Hen and Grebe upon the list of game birds, as the first named is the only one that is edible, and the others would be shot only for useless "sport." The law provides, fortunately, for an absolutely closed period upon the Wild Pigeon until April 22, 1915. However, it is our opinion that at that date it will be found, unfortunately, that there will be none of these very interesting birds in our State.

The Audobon Society is growing stronger both in Pennsylvania and in the United States and is doing good work in bird protection and in creating and maintaining public sentiment in this regard.

In the Report for Pennsylvania by the State Secretary, Miss E. W. Fisher, which was published in "Bird Lore," Volume IX, No. 6, for November and December, 1907, is the following:

" * * * The business of reorganizing the Society on this permanent basis represented most of the 'new work' done this spring, but the old activities were still kept up. Twelve circulating libraries were kept moving in the State, and a number of school children and children in societies, such as 'Bands of Mercy,' etc., have signed the Audobon Pledge and received certificates of associate membership.

"The increase of the public sentiment for bird protection has been quite marked during the past year in this State, largely due to the good work done by the State Zoologist, and the Audobon literature distribution in schools. Indeed, it is to the intelligent work of the public school teachers who take up the subject that the Audobon society owes some of its best results in the country districts.

"The society hopes to follow up its organization this winter with several public meetings, where illustrated talks will be given by those prominent in bird protection and ornithology (which seems still to be one of the most successful ways of reaching the general public), and by special work among the schools."

Considerable literature has come to our desk. One of the most commendable was Bulletin No. 30, by the Biological Survey, of the U. S. Department of Agriculture, entitled "Birds of California in Relation to the Frait Industry." This consists of one hundred pages with five plates and will prove of considerable interest to bird students. We regret to be obliged to chronicle the suspension of a valued and interesting publication known as "Birds and All Nature," by the Nature Publishing Company, of Chicago, as this pictured objects in natural colors, and was commendable in its popular instruction. The Ornithologist of your Board has prepared a set of colored slides of birds and occasionally gives popular lectures on this subject, the last having been as recent as last Friday night to a church audience in Harrisburg. We recommend further activities in bird protection and intelligent legislation along this line.

Several reports have reached us concerning the increase of the English Starling and the damage done by this bird, which appears to be in its habits and haunts or place of living intermediate between the Blackbird and the English Sparrow. We regret its introduction into this country, and recommend its destruction. It appears to be a grain eater and fruit eater without much value as an insect killer. We here show specimens of the same, with the hope that it will be more readily recognized than from descriptions. These specimens were kindly loaned for this purpose by Dr. William Deutcher, of the American Museum of Natural History, who is president of the American Association of Audobon Societies. The Starling resembles a brownish blackbird with white specks or small spots on the back, but its long-drawn whistling note enables it at once to be distinguished from any blackbird found in the State.

The CHAIRMAN: Now, gentlemen, if you have any questions, I have no doubt the Professor will be glad to answer them.

MR. NAGINEY: How do you distinguish the difference between these birds?

PROF. SURFACE: I have published a description of them in my book, and I have also prepared a series of colored lantern slides, which I think will prove very beneficial. I sometimes give an illustrated lecture, the last one having been given no later than last Friday night, in one of our churches here in Harrisburg. Or, if any school or Society wishes them, I have no objection to loaning them, provided they are returned in good condition. I do this because I am anxious that the difference between birds that are beneficial and those that are detrimental to the farmer should be clearly understood.

MR. HALL: Beg pardon, but did you not forget about the Starling?

PROF. SURFACE: Oh, yes; I am glad you called my attention to that. The starling is a bird that has been imported from Europe to New York State in the last few years, and it has spread into our State. It is very closely related to our blackbird and is somewhat on the order of the English sparrow. You will say that it is a pretty low breed of birds to cross but in its habits it is about a cross between them. It is a bird that should not have been imported in this country. It will become to your fruit trees what the English sparrow has become to your gardens, and I would recommend its destruction. It will fly into the furrows after the corn seed while the farmer is plowing, and when it rises, you will think it is a blackbird, until you hear him whistle, and then you will think he must have something wrong with his throat, and then you shoot him, and you find there is something wrong with his color, and you become suspicious that it is an English Sparrow, but you find it is not; in that case you may be sure that it is a Starling

MR. SCHWARZ: For what purpose were they imported?

PROF. SURFACE: For the purpose, I understand, of introducing the English Song Sparrow into our country. They have also tried to bring in the English Sky-lark. It seems to be the same class of people without any brains, who introduced the English Sparrow into this country in 1854-56. What a pest he has become we all know.

MR. BARNES: Do you believe in the destruction of the English Starling?

PROF. SURFACE: Yes, sir, I do.

A Member: Does it eat fruit?

PROF. SURFACE: Yes, sir; he does; he injures fruit and gardens.

MR. GOODERHAM: I understand the Dr. to say that he is opposed to paying bounties for the destruction of the animals as provided for by law?

PROF. SURFACE: That is my position, Mr. Chairman, and it is made after thorough study of the situation. Since this law was passed some ten or twelve years ago, it has become almost certain in our studies of Economic Zoology that the State has spent thousands and thousands of dollars uselessly. The heads of squirrels, for instance, were offered for examination, as the heads of weasels.

and the bounty paid by the unzoological township officers, who did not know the difference. Hawks, which I know to be one of our most beneficial birds, have been slaughtered by the thousands for the fifty cents bounty paid on them. These birds feed on green caterpillars, and do much more good than they do harm. Nor will this destruction under the bounty law help matters much in the future. Take, for instance, the muskrats; they kill a few each year, but they leave enough to re-fill the place. If you shoot a million dollars' worth of muskrats and weasels this year, so far as the bounty is concerned, it will not make any perceptible difference at the end of five years, because those that are left multiply so much more rapidly that the decrease is not in proportion to the increase.

MR. BLYHOLDER: Do you mean to say that by killing them you increase their production?

PROF. SURFACE: In a certain sense I do. There is a certain amount of food that these animals will take, and there is a certain biological law that limits their multiplication. Beyond a certain point, under this law, they will neither increase nor decrease; nature provides for that.

MR. BLYHOLDER: Would it not be well to introduce a plan whereby these things might be taught to those who have charge of making our laws?

PROF. SURFACE: I agree with Brother Blyholder, that the cure lies in education.

MR. CLARK: What about the cat?

PROF. SURFACE: I have a high regard for a good house cat.

MR. HUTCHISON: Mr. Kalbfus does not agree with you; in an interview published recently, I see he regards the cat as one of our worst enemies.

PROF. SURFACE: Yes, I know, and I am sorry that my opinion was asked, because I don't want to say anything that might be regarded as a criticism on him, but my opinion has been asked, and I shall have to give it. If I had a good house cat, one that had proven her value, I would keep her and treat her well; she destroys far more rats and mice that she does birds, and many of the birds she destroys are pests, so instead of an enemy, I regard a good cat as one of our best friends.

MR. CLARK: But the substance of his remarks is absolutely true.

PROF. SURFACE: Oh, yes; I recall very clearly the interview in question; he thinks the cat is an absolute pest and he wants it killed, but I still contend that it kills more rats and mice than it does birds, and there are places where a good cat is an absolute necessity. I have one now around my office, and she keeps the place clear of rats and mice, and in that respect is extremely useful; the few birds she kills, if any, do not impair her usefulness, and I claim her as one of our best friends. The weasel is also one of the chief enemies of mice, and yet we are placing a bounty upon it. The same thing holds true of the black snake; he is one of the worst enemies of rats and mice, and yet we kill him. As long as we keep up our warfare against our friends, we will have a hard time exterminating our enemies.

The SECRETARY: How about the song cats that engage in concerts in the night?

PROF. SURFACE: That all depends on individual taste. If we like that kind of thing, that is the kind of thing we like.

MR. McCREARY: How about the ferret?

PROF. SURFACE: A friend usually, but I would not recommend the use of them.

A Member: How about the climbers?

PROF. SURFACE: They are like the skunk, simply one of our best friends; because the skunk eats a few chickens, we regard him as an enemy, while in reality he does far more good than we think. It is the same thing with the owls.

MR. NAGINEY: Is it not the same thing as with the weasel?

PROF. SURFACE: The same thing exactly. It is one of our most useful friends in protecting against rats and mice.

The CHAIRMAN: This is a very important discussion, and a very interesting subject, but we have a number of reports yet to hear, and shall, therefore, have to stop here and proceed with the next subject. What shall be done with the report?

MR. HERR: I move it be received, and filed with the minutes of the meeting.

This motion having been properly seconded, and the question put, it was so ordered.

The CHAIRMAN: Is the Executive Committee ready to report? If so, we will now have that report.

MR. GLOVER: The Executive Committee begs leave to present the following report: (See page 7.)

The CHAIRMAN: It is about time for the Governor to make us his promised visit, and I would suggest that when he comes in, the audience rise, and remain standing until he takes the Chair.

After hearing the report of this Committee, what is your pleasure?

MR. SNAVELY: The Committee has seen fit to make several changes in the Standing Committees; hereafter the report on Apiary and Forestry will be made by Specialists.

The CHAIRMAN: What is your pleasure, gentlemen, in regard to this report?

MR. HERR: I move it be received and adopted.

This motion having been properly seconded, and the question put, it was so ordered.

PROF. SURFACE: Mr. Chairman, may I just add a word, please? One of the Consulting Specialists, Prof. Klinger, is the President of the State Bee-Keepers' Association, and I hope he may be able to interest more of the members in bee keeping. It is such an easy thing, and such a good paying one, that I have often wondered why more of our farmers do not take it up.

MR. HERR: I wish to say that I received a telegram from Mr. Harvey, one of our Geologists, yesterday, regretting his inability to be present at this meeting, owing to an attack of the Grippe, but that he will send his report later. I move that when this report is received it be accepted and published with the rest of the proceedings.

The SECRETARY: I second that motion.

The question being put, it was so ordered.

The CHAIRMAN: Are there any other committees ready to report? Oh, excuse me, I didn't notice that there is another Geologist. We shall now have the pleasure of listening to Mr. Stout's report.

MR. STOUT: If you people are interested in rocks, I have here a few samples that you may want to look at. Of course, there are so many—

At this point the Governor came in, and the audience arose, and remained standing until he had taken the Chair.

The GOVERNOR: I don't propose to disturb any discussion; I suppose you have some very important subjects this morning. I want to thank you very kindly for the honor of sending a committee to escort me to your session. As you know, there are a great many things that the Executive has to attend to, and they are not always pleasant, but I assure you that presiding at an agricultural meeting is a pleasure to me, and I am always glad when I am called upon to attend one. I thank you for your attention. Mr. Stout will now proceed with his report. (See page 127.)

## REPORT OF GEOLOGIST NO. 1.

### Soils, Forestry and Practical Geology.

By DR. ISAAC A. HARVEY, *Lock Haven, Pa.*

Upon assurance that I might be indulged in some digression from the usual and routine or conventional form of report, I venture to submit some thoughts, in a cursory way, on Soils, Forestry and certain aspects of Practical Geology, as it affects the material interests of the farmer.

In the past year, I have received very few inquiries relative to the various subjects, which, in my province as an Economic Geologist, are of direct import or concern to the farming community; but I have been engaged, largely, in the development of mineral properties, and assume that it is entirely proper to avoid any technical discussion, awaiting opportunity, therefor, perchance, in the future, or leaving the same to the gentlemen, who, as specialists, have had more direct and actual experience in these matters, as relating to Agriculture or Practical Farming. I oftimes observe, however, the varying qualities, diverse origin and apparent composition of soils, as I make investigations through various portions of the State and in many counties, and it is a query with me, what experiment may determine as to their use or adaptability for special or general cultivation; that is, in the several shifting stages of deposit as derived by erosive processes from the most recent to the most remote geological formations, exposed in the State, with their diverse chemical constitution or structure. It seems to me, that the work of the analyst or chemist, alone, will solve the true genesis of Soils and their actual utility and adaptability; in connection, also, with continuous experiment. From the head waters, the springs or fountain heads, of our rivers, and, especially, in the coal measures, I have, incidentally, observed the detritus, the debris and the alluvium, produced by erosion, weathering and the slow disintegration, from which our soils are derived, with their components of Silicia, Alumina, Lime, Carbon, with traces of Iron, Soda, Potash, Magnesia and other elements, for the most part mechanical and inert, and yet how much is soluble, as these soils, apart from their vegetable matter, are produced by the action of water and the atmosphere, and all of the chemical elements are not entirely inactive. Following the course of the various streams, or tributaries, and of our rivers, their entire length, from the Coal measures, through the successive formations, to the Gneissic or Azoic Rocks, as exposed, and including sandstone, shale, slate, limestone, clays and the other deposits of rock and minerals, represented by the numbers, from I to XIV, of our State Geological Survey, with some even more recent as well as remote strata; the differentiation of soils, whether as alluvium or permanent deposit, would be an interesting and usefnl study, and by the application of chemistry and experiment, thereto, some new facts may be derived that will contribute, more directly, to their practical availability.

I have thought much on this subject, while making a study of the geological aspects of the several counties, and have wondered what the outcome would be, if the composition of these soils, from the source of the rivers to the shores of the sea, would be divulged or determined. For instance, the superior crops of buckwheat, in certain districts which will hardly produce other grains so well, and the excellent growth of vegetables on the hills of the northwest counties, defective in some cereal crops or growth, and, indeed, surpassing in some respects, the product of the lower counties, are suggestive of some queries and experimentation which may reveal other important facts, that will be a direct guide to the farmer in the use of these varying soils, and enable him, more certainly and intelligently, to cultivate the same. But, to my mind, a more urgent and insistent subject and one of more import directly to the farmer, is the preservation and restoration of the forests—our timber and trees; for what farm is a home without woodland, and what so much enlivens the hill valley, mountain or plain, as trees,—

abundant timber, in its native or even its cultivated production or growth. Deforestation is desolation, and without trees we are without a certain inspiration, a resort, a sylvan retreat, which in its pristine beauty, was wont to lift us, sensibly into higher thought and nobler spirit. We are nearer to and almost in touch with, the infinite, so certainly as we are in the forest,—the wilderness; and never quite so free from our own evil fancies, rancors and enmities, as we are in the native woodland or in the mountains with their varied growths of Oak, Pine, Chestnut, Fir, Ash and the many other beautiful trees. We are never so free from care and the anxieties that beset us in business life or in the marts of trade, as when we leave our busy affairs and go among the trees.

It seems to me that no one, either in respect to his material benefit and actual happiness, should be more interested in, or more devoted to, forestry than the farmer, and the prevalent destruction of forests, regardless of economy in a material or financial sense, or in its moral bearings, is hardly short of vandalism and does not have that regard for those that come after us, which every consideration of kindness and foresight for them should certainly prompt or inspire. It is a clear proposition to my mind, and a truth, that nature, if protected, supported, encouraged and aided, will supply every generation with adequate timber, from the lands already denuded, and it is the insistent duty of all citizens to observe that dictum and give nature and the native trees a chance. The State's purchase of lands for a nominal price, is a step in the right direction and these areas, in thirty-five or forty years, will afford vast quantities of saw and structural timber for all uses. True, one single year of growth, on a given tract, would hardly show, to the casual observer, any perceptible gain or value; but, in three or four decades, with the trees safe from fire and carefully guarded from other sources of destruction, the results would astonish any one who would figure the actual aggregate value, that would thereby be produced, in trees of varying growths and kinds. Do your part and nature will do the rest; and I am sure that the study of forestry, with its direct advantages to all, will appeal to your good sense and become, increasingly and absorbingly, a subject of actual interest and of energetic effort on your part and in the right direction.

While the soil of the surface and the growth thereon, whether of tree, fruit or grain, is of great import, and, apparently, of the most value to the farmer, I apprehend, that the deposits, unknown and undiscovered, that lie beneath the surface, are, in many counties, of quite as much, and, in many instances, of decidedly more, actual interest, and economic and commercial value to the tillers of the soil. The minerals on his farm or unseated lands, whether coal, clay, iron ore, limestone or cement, are just as absolutely and entirely his property as the soil on the surface, the timber thereon, or the grain in his barn; and this argues, pertinently, to me, the importance and the direct advantage to the farmer of acquiring some knowledge of Practical or Economic Geology; especially, the aspects and the strata, thereof, that are exposed, in part, or may be found upon his own property and the formations in his own immediate district or county. It is true,—and I know whereof I affirm,—that ten thousand farmers,—and, indeed, a multiple of that number,—have been dispoiled of their valuable mineral deposits, defrauded of their coal, clay, iron ore, limestone, and what not, owing to the fact that they were deficient in knowledge of the geological surroundings and the mining aspects or mineral deposits at home, and were thereby easily deceived, relative to the actual presence or value of the same. The Geological Survey, from 1874 or 75 to 1895, was extensive and far reaching in its design, efforts and publications, and every county and district, so called, received a measure, if not a modicum, of attention and study, and a report, thereon, containing as much detailed and descriptive geology as was possible under the conditions attached and the means provided. But the appropriation of three quarters of a million of dollars, was really not more than a bagatelle; enough only for the real initiative of a complete and perfect Geological Survey and such as the importance of the State demanded and its citizen land owners deserve. The successive Legislatures, doubtless, with a proper spirit, but without the remotest conception of the actual work required or appreciation of its value and importance, in a commercial and utilitarian sense, made such meagre provision or allowance of money, that it was impossible for Prof. Lesley, great and capable as he was and a master mind in geology, to secure, in all instances, the most efficient experience and ability that the conditions required; and much of the work was done, hastily, and under such limitations of time and means, that the outcome, in many instances, was a misfortune and a calamity, I may say,—the undoing of a vast number of land owners who relied on such reports and maps, as were thus published, for guidance and information and which the several assistants of the survey, though well equipped, were fully aware could not be a certain or reliable guide in all localities, relative to the coal and other mineral deposits. My own experience was typical. In 58 or 60 days, I sketched the formations of two important coal counties, containing over 1,100,000 acres; while justice to these two counties, and to myself, indicated, that I should have had a "full" year for the construction of the map of each county. It was not possible to give a correct coloring of the coal areas and other formations, in so short a period, and with only $1,200 to defray all of the expenses, incident to the field work and completion of the said two maps. One most deplorable result of this defective work,—and I do not reflect upon the ability or integrity of any assistant engaged on the survey,—was, that vast areas of coal and clay lands were not included in the basins, as described in the reports or defined by the maps, or the actual height of measures was not indicated or the scope of the same accurately depicted; and, in a score of counties, the expert, or underling, employed by some autocrat of the coal trade or other designing speculator, found it most convenient and easy to dupe or mislead the farmer, or other land owner, by referring to the Geological Survey of his county, or the map and report thereon, and belittling his mineral deposits or denying their presence, on his lands, entirely, when the said expert knew that such minerals were there and of greater or less value. A farmer, ignorant of the coal or other deposits on his land, is induced to permit a driller, by direction of some capitalist, to take a core, with a diamond drill, from the formations on his farm; but the farmer is not permitted to see the core. It reveals to the driller, peradventure various coal seams, from 3 to 10 feet in thickness, not to mention good clay and iron ore, and the owner of the farm is apprised that there is no coal of any value, or over three feet in thickness, on his lands. He sells the whole right, thereof, for $10.00, $15.00 or $20.00 per acre; which would be barely one-tenth of its value, at that juncture, and very remotely so, when the railroad shall be located in that vicinity. After a lifetime of plodding, ploughing and toiling, on eight, ten or twelve inches of soil, in his later years, he is very many times robbed, cheated and lied out of his coal, clay or other mineral values; simply, because he has no means of knowing what might possibly be concealed in the rocks and slates of his farm. Is this not deliberate robbery? Or would it be any worse for me to enter your granary with your consent, measure one-half, one-fourth, or, even one-tenth of your corn, oats and wheat, and, upon this measurement, buy the entire crop or the actual contents of your grain bins? Is this not scientific stealing, of which we may study so many and various aspects in almost any direction, and do we not have here, in this "Grand Structure," an elaborate and gorgeous demonstration of stealing as an exact science? I have reported on 400,000,000 tons of coal on territory, supposed to be devoid of coal. Does not the real importance and necessity of learning something about Geology occur to you, who have given it no thought or study? As a science, it seems to be quite as obscure and remote as some indefinable aspects of religious superstition, with which, also, Geology seems to be associated in the minds of many people. Five millions of dollars, for a Geological Survey, would have been a meagre allowance and in no other sense, more so. than as a safeguard for the small land owner or those who have not big capital.

There are ethical and doctrinal phases of this subject and it is suggestive of many things, that appeal to your attention and reflection, in this direction, as well as in many others. You have, I may say an eternal, a perpetual suit in equity, perchance, in trespass, against those who thus infringe on your rights. In the moral features of this and other questions, remember you are not entirely segregated from other classes of your fellow citizens. The conservators of our best state and national interests, your rights must be admitted, and this deplorable inaccuracy of the Geological Survey, from which you have suffered as you have from bad politics and bad business, must convince you that it is due either to careless oversight or deliberate indifference on the part of those that could provide a remedy; while other departments have been accorded more favorable consideration in the Assembly. This dereliction has afforded opportunity to the designing schemer and speculator and you are mostly the victims. Every true science is progressive towards the betterment of all; but, apace and commensurate with these "fair sciences," is the science of commercialism, with all that it implies to the wise and which, were it estopped, how much better, in all respects, would be the Commonwealth. Verily, these things look like self seeking, evil design and financial craft gone to seed and money getting gone mad. The farmer, inherently and by association, is in favor of temperance, honesty in politics and business, patriotism, education, and every virtue that pertains to true manhood and true womanhood. He believes in more equitable and just distribution of wealth and wages; he is favorable to the church, and to the Commonwealth and to the United States as against any perverse or partisan control. He is utterly adverse to the saloon, autocracy, aristocracy, communism, nihilism, anarchism, the social evils, monopolies, the centralization of wealth, excessive and indiscriminate immigration and all the pernicious forces that have their genesis in the centers of population. He suffers, albeit, more from vicious methods and their incidental evils, than other classes. His power is known if only asserted. When patience ceases to be a virtue, forbearance becomes a crime; and of what avail is your moral force or influence, if it be latent, dormant and not a living, active agency,—more potent, as it might be, than any other that may be employed for universal good. The single abuse of privilege and advantage, in the direction of geological matters, as described, and by which you have been undone, for a quarter of a century, entirely justifies me in this digression. I submit, that the truest citizen, the truest farmer, the truest politician or statesman, the truest financier, the truest patriot and American, is the truest Christian.

Adverse comment on our great evils is not pessimism. Pessimism is error in its most repulsive and forbidding presentation,—cloudy, repellant, ominous. Optimism, so called, that connives at offense, condones sin and is sanguine and elated, even when evils are prevalent and almost all powerful; or is smiling and indulgent towards the destruction that seems imminent, is hardly better than avowed pessimism. In this respect, it is hardly less perilous than any other heresy that becomes extant or any other evil contagion that threatens. This view, as I entertain it, may not be roseate, or meet the approval of those who would extenuate these things; but it is reason,—a rational determination of conditions, and, as you have suffered deprivation and deception, "you millionaire farmers," so, also, you have the moral stamina and the intellectual status to rectify these perverse things, "these evils that so easily beset you," by harmony of action and effort. I know of no politics quite so pernicious, no stealing quite so systematic, no wickedness in high places quite so insolent, conspicuous, exemplary, or vicious, as here in Pennsylvania, and the record sustains the affirmation.

Some of the gods that we seemingly and, perchance, ignorantly worship, are the prevalent immoral forces which we see almost every day, in fulsome exhibition or disclosures.

Let these Penates be forgotten, the tutelar Deities be remanded to oblivion, and the social, financial and political gods, that we, or many of us, most adore, be set aside, discredited and repudiated, and rising from our obedience, before their broken and shattered altars, and in the light of our true faith, these same gods may become known and recognized only as the "Demons that we most despise."

The following report was read by Mr. Stout:

## GEOLOGY AS RELATED TO AGRICULTURE.

By W. H. Stout, *Pinegrove, Pa.*

Mountain, valley, hill and plain are features on all sides of us. Were it not for elevations and depressions the surface of the earth would be a monotonous plain, everywhere the same, the wealth of minerals inaccessible and the soil the same everywhere. Great convulsions, subsidences and upheavals, alternate periods of overflow and recession of oceans were the means of producing the conditions as we observe them.

Reckoning time and distance as we do in minutes, hours, days and years, distance in yards and miles we can faintly conceive what millions of years eons of time signify. This planet upon which we are destined to spend the few days allotted to us is on a wild career. Flying through space at a distance of eighty million miles from the ruling planet of our system, the sun, the earth is moving through the space at the rate of 19 miles a second, and spinning like a top in its revolutions at the rate of 17 miles per minute. We are certainly traveling at a rapid speed, possibly following other systems the same as ours, all holding their relative positions in the universe. We read and speak of the everlasting hills, but they are not so everlasting after all, since the elements are ever at work reducing them to lower elevations, so that thousands of feet of mountains were carried away. Heat, frost and chemical action are reducing by disintegration the solid rocks forming soil, some of which is constantly on the move by gravity, and through rivulets, streams and rivers, carried to tide water and the oceans. The deltas of the rivers and the coast line from Nova Scotia to the Florida Keys contain vast deposits swept from the continent among which is some of the best soil from our fields, so that by injudicious tillage we lose the finest, the best and most fertile of our soil.

Prof. Claypole in his Geology of Perry county, makes a calculation as to the amount of erosion and the material carried by flowing water.

"In ordinary weather a gallon of Juniata water carries about 8 grains of earthy sediment, or a pound for every hundred cubic feet of water, so that, 1,000,000 cubic yards of rock sediment is brought from Juniata, Mifflin, Huntingdon and Blair counties every year.

Twenty-five thousand feet of the deposit has been removed since the mountains were formed in that section. This is upon the assumption that the flow of water and the climate were the same during the period of erosion, it may have required five, ten or more millions of years to carry away five miles of mountain elevation." Thus changing from an Alpine condine to the present features the section drained by the Juniata River.

If then a comparatively small river removes such quantities of material we can conceive what a river like the Mississippi carries with its always muddy current which, it is estimated, carries annually a cubic mile of sediment to deposit near its delta, material composed of numerous formations through which it flows. The soil thus formed is among the most productive, and the overflow of the river renews the deposits periodically, forming a soil and conditions similar to the famous Nile Valley. The mixing of material from so many rock formations gives the soil the mechanical and chemical condition to produce the most productive soil. Much of the sediment deposited by the Mississippi River remains somewhat permanently at its mouth, near shore, shallowing the channel used for navigation, that New Orleans in danger of losing its shipping had

Captain Eads construct a sort of hamper or wicker work from willow twigs, which were filled with stones and walled up in the bay, through which the water is forced in a channel used for shipping.

The U. S. Government only recently performed the same kind of work at New Orleans to prevent the channel from being silted so as to prevent vessels from entering and leaving the harbor. Although but a small proportion of vegetation consists of mineral elements derived from soil constant cropping year after year is a drain that exhausts the most productive land. It is calculated that in two crops, one of wheat and one of oats, grain and straw remove about 400 pounds of mineral elements, potash, soda, lime, magnesia, silicia and phosphoric acid from an acre of land. The U. S. Department of Agriculture, the various Experiment Stations and Boards of Agriculture perform a service of inestimable value, and we farmers usually accept their theories and teachings without question, but it should be recognized that even those of highest authority are not infallible.

A Bulletin issued by the U. S. Department of Agriculture by the Bureau of Soils, "Farmers' Bulletin No. 257," maintains that "All ordinary soils, including the so-called exhausted soils, contain sufficient plant food for good crop yields, and this supply will be indefinitely maintained, without the addition of any of the plant food elements." The application of fertilizers it is claimed does not usually add any plant food directly to the soil but acts rather as medicine to neutralize poisonous substances in the soil, the same as calomel, quinine, etc., are used for specifics in diseases. This is a theory not warranted by facts, yet some Institute speakers proclaim this theory before audiences of farmers, and it is likely to lead to serious mistakes.

We hear and read about abandoned farms in the Eastern and Middle states, in the older sections where farming has been practiced for several generations, and were it not that the fertile western plains furnish grain and feeds of various kinds; Germany supplies potash; Chili, Nitrate of Soda; Florida and Sicily, Sulphur; the Southern states, Phosphate Rock and Bones, with other slaughter house refuse, wherever obtainable, supply Nitrogen and Phosphoric Acid, substances that are not only stimulants but direct plant food; Agriculture would be less prosperous than it is. As westward the empire made its way, so followed exhausted farms, and were it not that the things enumerated were available, there would be many more abandoned farms and not alone farms but whole communities would be depopulated. The great and fertile plains were considered inexhaustible, commercial fertilizers were hooted at in many sections, and the farmers enriched themselves with the stores of plant food accumulated during past ages, but the soil is becoming less and less productive, so that even Kansas recently enacted laws governing the Analysis and Sale of Commercial Fertilizers in that state.

We have a great variety of soils of different ages and formations, much of it derived from the disintegration and redepositing by water action forming stratified rocks, composed of sand and clay, together with other elements. We have also soils organic in origin, derived from minute organisms, in the oceans, eozoon, globigerena, and corals, from the remains of which were formed mountains of limestone, and because of their organic origin and the mechanical condition of the soil derived from disintegrated limestone produces fertile lands throughout the world wherever limestone is found. There are also soils of vegetable origin, like coal, plumbago, etc., containing usually an excessive quantity of carbon not favorable for plant growth. Given a soil of reasonable depth with physical conditions, a proper proportion of sand and clay, neither too fine nor too coarse, it can, by the application of fertilizers and good tillage be made productive.

The little things, microscopic objects, play a very important part in agriculture, for while during ages past, races of people, vast numbers of animals and insects yielded their remains to the soil, the micro organisms have played a much more important part in soil production and soil physics than did those of a higher type of animal creation. We are in the midst of a most interesting section geologically, with the Silurian system largely between the Blue Ridge and the South Mountains, a bay of Mesozoic coming in at Hummelstown, the Devonian appearing about Rockville, the Carboniferous about Lykens, and the Permian higher in the series. Evidences of great climatic changes are in evidence in these sections, the eruptive or trap rocks in Adams, Cumberland, Lebanon, Lancaster and other counties, extending from Nova Scotia to North Carolina, the outpouring of molten material in a chasm of various widths, indicates a disturbance in the interior of the earth of vast dimensions and importance. The hills around Gettysburg, at Elizabethtown, Bunker Hill, also in Montgomery, Lehigh and Northampton counties yield a good road material, but not good soil.

The Devonian system termed the Age of Fishes, has soils in great variety, from fairly good to that of very poor quality. The Carboniferous in the Anthracite coal field has no soil worthy of the name, being composed of sand, clay and conglomerate rock unfit for cultivation. This is, however, a very important formation, indicating a period of tropical conditions when trees like the palms flourished near us and produced successive strata of coal and shale many feet in thickness, furnishing the best and only fuel of its kind yet discovered. Succeeding the Carboniferous, appeared the Glacial Age when as near to us as Catawissa and Berwick, masses of sand, gravel and boulders were brought from more northern sections and deposited on the surface overspreading the coal measures, with a mantle of till and debris of many feet in thickness, obstructing and changing the channels of streams in other directions, and producing during this period all the fresh water lakes north of the southern line of the Glaciated Area.

The GOVERNOR: Any questions, or any discussion on this report?

MR. McCLELLAN: I move that it be received and placed on file.

This motion having been properly seconded, and the question put, it was so ordered.

The GOVERNOR: Next in order, I believe is the report of the Committee on Cereals and Cereal Crops, by the Chairman, Mr. A. P. Young. Is Mr. Young in the room?

Mr. Young then read the following report:

# REPORT OF THE COMMITTEE ON CEREALS AND CEREAL CROPS.

By A. P. Young, *Chairman.*

In importance and value to the human race, the cereal crops stand preeminent. They furnish in one form or another, food for man and for the domesticated beasts that accompany him in all climes. They are susceptible of transportation and preservation for long distances and periods of time. Being less perishable, they furnish a ready means of relieving distress in far distant regions, brought about by failure of crops, or from any cause that may render the people destitute, of their usual food supply. In all ages, and in almost all parts of the world, destitution has occurred, famine sometimes carrying off large numbers of the human race. In these emergencies, the countries that produce largely of cereals have always been looked to for relief.

In this report we will not attempt to deal with all the cereal crops, nor to set forth the amount of production or value. These statistics, collected by the United States Department of Agriculture, and furnished by other good authorities, are accessible to all. The Department bulletins may be had for the asking.

The cereals in which we in Pennsylvania are most particularly interested are corn and wheat. From these we get our bread, and largely our butter and meat, as well. These crops take kindly to the soil and climate of all parts of the State, different varieties of the two grains adapting themselves to the environment remarkably. Our production per acre, low though it be, ranks well up toward the head in the table of production of the different states. Quality of both as raised here is equal to the best. When we compare, however, our average yield with the maximum crop produced, we become aware of the great need there is of bestirring ourselves to lessen the gap between the average crop and the highest yield possible. Many times the average yield fails to return enough to pay expenses of labor and seed.

There are many avenues leading up to better things. A few only can be enumerated here. Take corn first, since it leads in financial value. The seed is important. Is it fully adapted to soil and climatic conditions? Are the ears uniformly of good size with deep grains and small cob, well filled out? Does it produce an ear of fair size to every stalk? Or is it giving to producing many barren stalks, suckers and nubbins? There is certainly urgent need of improvement in our seed corn. Go to a load of corn, or into a crib, and pick out a perfect ear. A single trial will convince any one that perfect ears are at least the exception, and not the rule. The crop of Pennsylvania the past season was millions of bushels short, mainly from preventable causes, not the least of which was poor seed. Seed corn should be selected early, thoroughly dried and protected from the damp atmosphere of winter thaws. It is not enough to dry it in the fall. It must be be protected from dampness, and the sudden changes that come along in our winters. To neglect in these particulars may be traced uneven stand, weak plants, some of the grains failing to germinate, others making a slow start, so that instead of being all in sight in a week or ten days at most, they come dragging along for a month, the last to get through being so discouraged as to produce a spindling, weak stalk and never an ear. In defining a weed, an eminent authority says it is "a plant out of place." If, by having too many stalks we fail to get ears, are we not tolerating weeds right in the corn hills? If there be four stalks where but three can come to perfection, is not the fourth stalk in its effect on the yield, a rank weed? A single additional grain on an ear, an ear added to a rod of row, will make many bushels in the aggregate crop of the State.

As to wheat, the Crop Reporter for January, 1908, discussing comparative yields for the past forty years says, "In Pennsylvania the difference in favor of the last twenty years is 2.1 bushels per acre; in Ohio it is a little over half a bushel; in Indiana it is three tenths of a bushel; in Illinois, it is about one and a quarter bushels; in Missouri it is one-fifth of a bushel, and in Nebraska, as already stated, it is over two bushels, or nearly the same as in the old State of Pennsylvania. In the state last named the question of original fertility may be set entirely aside; and in periods of so great a length as twenty years, the effects of exceptionally good or bad seasons will be so nearly balanced that these too, may be left out of consideration.

"The figures for Pennsylvania may, therefore, be pretty confidently interpreted as a sign of substantial agricultural progress. The figures of several of the other states that show increasing yields, may be less convincing, but it should be remembered that such gains as stand to the credit of the last twenty years immediately preceding, have been in spite of the greatest discouragement that wheat growers have ever known; for the period from 1888 to 1907, inclusive, comprises many years in which the price of wheat scarcely covered the cost of production in the very states where agricultural practice is at its best, and where the most progressive farmers were to a large extent drawn into other lines of agricultural production."

So much for advancement in our grand old Commonwealth. But instead of a gain of a little more than two bushels in average yield in a period of forty years, we can in the next twenty years, by strict attention to business, with the assistance of the light that is coming from our Departments of Agriculture, National, and State, supplemented by our Board of Agriculture and Farmers' Institutes, nearly or quite double the yield of sixteen and six-tenths bushels with which we are now credited, if we will but make the best use of our opportunities. Every wide awake farmer realizes that we have been spreading over too many acres. The recent very low price for wheat and high price for labor has made it imperative that we produce more bushels from less acres, get more returns from less labor. Then, there is a great opportunity for improvement in kinds of wheat grown; many bushels may be added to our aggregate by sowing better varieties. Other bushels may be added by cleaning out foul seed. It is astonishing to see the extent to which cockle prevails in some wheat fields. Passing along the highway, or observing a near-by wheat field from the train, along in June the flowers are often frequent enough to make one think of a flower bed. It seems as though the time had come for a determined effort to be made to overcome the loss occasioned by foul seed. The ordinary wind mill won't clean it out. Cockle in wheat, smut in corn, are entirely too prevalent, and should not be tolerated to the extent that they now prevail.

To combat these and other pests, as well as to make a general advance along the whole line agriculturally, would it not be well for each township to maintain a seed farm for testing in search of best varieties, to disseminate clean seed, and teach better methods of cultivation? How about the Township High School or the Consolidated School? The towns are setting up shops, getting tools, teaching manual training, endeavoring to make their pupils adepts at trades, which is all right; but we can't all live as tradesmen. What is to hinder our setting up a School of Agriculture on a farm in connection with the Township High, or Consolidated School and making the pupil familiar with the mysteries of propagation, cultivation, fertilization, and all that will be necessary to make a finished agriculturist for the century in which we live, and from this center disseminate better varieties and clean seed as well as intelligent farmers?

The GOVERNOR: Any questions or discussion?

MR. AGEE: The suggestion of the committee with respect to the selection of seed corn seems to me to be particularly applicable to this year. In our corn fields, from Iowa eastward, the crop has failed to mature as well as usual. In our own State, very few men have corn that has the vitality which will help to insure a good crop next year. The danger is far greater than most people realize. A Philadelphia seedsman tells me that he tried out a number of lots of seed corn offered him, and only two proved good. Now, the outlook for a good corn crop next year is not good. Unless we make every effort to secure good seed corn, we will find ourselves short next year hundreds of millions of bushels of corn. The seed corn lacks germinating power. It is not fully matured. And it is of vital importance to secure a good corn crop. Our School of Agriculture will be glad to send you directions for making a scientific test of your seed corn, if you will write us, so that you may determine how strong in vitality it is. Let us hear from you, and let us work together to secure the best crop we can get.

The GOVERNOR: What shall be done with this paper?

MR. HUTCHISON: I move that it be received and placed on file with the rest of the proceedings.

This motion having been seconded, and the question put, it was so ordered.

MR. HUTCHISON: The Legislative Committee is ready to report. I move you, therefore, that we hear this report at this time.

The GOVERNOR: Not hearing any objection, we will take up this report at this time.

MR. KAHLER, the Chairman of the Legislative Committee then presented the following report:

## REPORT OF THE LEGISLATIVE COMMITTEE.

In presenting this report at this time we deem it necessary to refer to a few things that have been accomplished in the past year, due, we believe, in a great measure, to the persistent efforts of this State Board by their endorsement and the sentiment they have created in favor of the measures, which we firmly believe will be the most efficient way of accomplishing what we want. For a number of years we advocated in this way giving greater privileges to trolley cars and for a two cent rate on our railroads.

Among the bills passed by the last General Assembly favorable to farmers we wish to name the new Feeding Stuffs Law, which is more stringent than its predecessor; the law requiring a chemical analysis of Paris Green and establishing a standard which it must come up to; the Meat Inspection Law, without which the Federal Inspected Meats from the West would have wiped out our Home Dressed Meat; The law requiring the wearing of metal tags by dogs on which license or tax has been paid, which is not stringent enough in our opinion; The Registration of Stallions, whereby we hope to get rid of the practice of raising poorly bred horse stock; The increased appropriation to the Department of Agriculture to be used for the destruction of plant diseases and insect pests; increased appropriation for Farmer's Institute work; also a larger appropriation for the Public Schools, etc.

We believe that the passage of the Act appropriating $500.00 to each county maintaining an Agricultural Fair for the purpose of increasing the amount of premiums paid on agricultural products exhibited will be of great benefit to the agricultural interests of the State, and the Legislature should be commended for the same.

In the last session an attempt was made to pass a bill requiring manufacturers of fertilizers to state upon the packages containing the same the sources from which the fertilizing ingredients are derived. This bill was vigorously fought by the largest fertilizer manufacturers of the State and Country, was passed without opposition in the House but failed to pass the Senate. We would recommend a renewed effort to pass this bill.

A bill was passed by the last Legislature by which the State was to pay for the betterment of our rural roads by appropriating fifty per cent. of the cost, but owing to the failure of the Senate to pass revenue bills the appropriation was not granted. We would respectfully recommend the same to our next Legislature.

We also commend the work of the State Highway Department for the good work that has already been accomplished in giving the farmers of the Commonwealth object lessons if nothing else in the work of good road construction, and very much deplore the fact that our Governor considered it his duty to cut down our appropriation for road building from $3,000,000 to $1,000,000, thus cutting down public road improvement very largely for the next year, or until the next Legislature makes appropriation for that purpose.

Also we express our approval of the Geiger Milk Law, which assures the farmers of this State a "square deal," in that he (the farmer) now receives his pay for every quart of milk sold, instead of as heretofore having to furnish 46 quarts of milk and only receive pay for 40 quarts. Formerly the farmer sold by dry measure, and dealer by liquid measure, but now both sell by liquid measure, thus making or establishing a uniform standard of milk measure.

Also the McGowan's Clean Milk Can Law, which calls for the thorough cleansing of all milk cans and other vessels shipped on railroads. Under penalty of $50.00 fine, no milk can now be returned by the receiver of milk, to the shipper of milk, unless thoroughly cleaned, which we regard as helpful in a sanitary point of view, as well of being of great value to the farmer.

We would also recommend an amendment to what is known as the Vaccination Law, placing the responsibility on the school board and not on the teacher, and placing the penalty for violation on the parent or guardian and not upon the scholar, as in many cases the result is that it deprives the child of half the term of school.

We would recommend an amendment to what is known as the State Road Law, wherein it provides for joint action of the State, County and Townships, and let the State take the whole responsibility of making the State Roads and distributing whatever money the State feels able to pay to the different counties in accordance with the miles of road in said counties, in a similar manner by which the school appropriation is distributed, which would be some relief to the overburdened taxation on real estate and would not be as complicated and would hasten the construction of our roads, for at present it takes months for all the parties to agree.

Believing that it is in accordance with the fundamental principles of our government that the majority shall rule, we also recommend the passage of a Local Option Law permitting the voters to decide whether the sale of alcoholic beverages shall or shall not be permitted in the communities in which they reside.

Your Committee are of the opinion that some legislation is necessary to make railroad companies, engaged in carrying passengers, give to the traveling public a "square deal." There are some railroad companies operating within this Commonwealth that, for the sake of being able to present to the public, time schedules that may appear more advantageous than those of their competitors, make their schedules so that the rule, and not the exception, is to be always late. Those wishing to travel must be at the station on time, and if the trains are habitually late precious time that might be devoted to business is lost. A law requiring railroad companies to pay a reasonable compensation for the time that passengers must lose in waiting for a train that is more than thirty minutes late, unless the company can show that the delay was caused by some unavoidable accident or unusual weather conditions, would go a great way toward remedying this evil.

There should be a law requiring bulletin boards to be provided at every station where an agent is employed, upon which shall be written a statement as to whether or not trains will be on time, and in case a train is late, a truthful statement as to how much late it is. Many times some one waiting for a train could, if he should know that it will be an hour late, leave the station and attend to some business or take a meal if near meal time, which he cannot risk doing if not informed as to the time when the train may be expected to arrive. Railroad companies should be required also to keep their ticket offices open long enough before the departure of each train to enable every one desiring so to do to purchase a ticket, and in every instance the ticket office should be open at least one-half hour before the departure of each train. Few things are more annoying than to be compelled to enter the rush that is sometimes made for the ticket window when, as is frequently the case on some special occasion, the waiting room is full of passengers and the window is opened but five or ten minutes before train time.

The condition in which waiting rooms and passenger coaches are kept in some sections of the State, especially on roads running between coal towns and other places having public works, at which foreigners are employed, is revolting. Railroad companies should be required to keep their waiting rooms and coaches clean and in proper sanitary condition.

In conclusion, Agriculture being the base of all property which is proven by all past History, we assert as follows:

Any nation that looks after the agricultural interests of the country has prospered on every hand, but, wherever the agricultural interests have been neglected, retrogression and downfall has been the result.

Therefore, in the opinion of this Board every effort should be put forth to foster our agricultural interests. Every dollar advanced for agricultural education will return an hundred fold. We believe that this end cannot be served better than to use every effort to promote the greater development of our State College, our Experiment Station, our Farmers' Institutes, Schools of Agriculture, etc., so that our State College, of which we are so proud, may yet "blossom as the rose" and favorably compare with our sister states, yea, place our grand old Commonwealth among the leading states of our Union.

A. J. KAHLER, Chairman,
HOWARD G. McGOWAN,
JASON SEXTON,
MATTHEW RODGERS,
S. S. BLYHOLDER.

## SPECIAL REPORT OF LEGISLATIVE COMMITTEE.

WHEREAS, the Pennsylvania State Department of Forestry, in behalf of the whole body of citizens of the Commonwealth, has purchased, paid for, and now controls more than three-quarters of a million acres of land which it is now protecting and reforesting just so far and so rapidly as the means placed at its disposal will enable it to do; and

WHEREAS, this Department has established and is now successfully conducting one of the leading schools of forestry in the United States, wherein foresters are educated for exclusive employment upon the forest reserves of Pennsylvania; and

WHEREAS, the Pennsylvania Department of Forestry originated and for a period of five years successfully conducted the Mont Alto Open-air Camp Sanitorium for the treatment and cure of tuberculosis, from which small beginning has grown the present State-wide campaign against this disease, resulting in an appropriation of a million dollars for this work by the last Legislature; and

WHEREAS, there is immediate and pressing need that this Department of the State Government be afforded ample means for a more vigorous prosecution of the work with which it is charged:

THEREFORE, BE IT RESOLVED, that this organization approve the continued acquisition of large tracts of denuded non-agricultural mountain land for the establishment of forest reserves with the attendant resulting good to be derived therefrom.

RESOLVED, that this Organization approve the work done by the Department of Forestry in the treatment and cure of tuberculosis by the forest camp system, an innovation which was unpopular and antagonized at the start because not understood; but which has culminated in the splendid organized system of combatting this disease under the direction of the Department of Health.

RESOLVED, Further, that this Organization recommend increased appropriation by the next Legislature for education in practical forestry, the purchase of additional reserve land, and the growing and planting of millions of forest seedling trees where now the Department is able only to plant by thousands, to the end that our farms may be better watered, our mountain sides covered with timber, the destruction by fire prevented, and the general welfare of the Commonwealth augmented for the common good of the whole people.

RESOLVED, further, that this Department be accorded legislative authority to grow and distribute to farmers, either free or at cost as may be deemed most expedient, seedling forest trees, when this is accompanied by a reasonable assurance on the part of the distributees that they will be planted in accordance with instructions from the Department and that they will be properly cared for.

A. J. KAHLER, Chairman.
HOWARD G. McGOWAN.
JASON SEXTON.
MATTHEW RODGERS.
S. S. BLYHOLDER.

The GOVERNOR: You have heard the report of the Committee on Legislature; what is your pleasure?

MR. HUTCHISON: I move it be received and filed with the minutes of this meeting.

MR. BARNES: I second that motion.

The question being put, it was so ordered.

MR. HUTCHISON: In enumerating the appropriations that came through the efforts of this Board last year, I failed to hear that of the State College. That was a thing we had been working for for years, and if it was included, I failed to hear it. I think mention should be made of it.

MR. KAHLER: It should have been included in this report, and I thought it had been attended to.

The GOVERNOR: The College is there.

MR. RODGERS: Can't we make an amendment?

The GOVERNOR: It can be included without any amendment. What is your pleasure in the matter? Suppose you read it as a part of the report.

Mr. Kahler then reads an acknowledgment of this appropriation, which is ordered to become a part of the regular report of the Board.

The GOVERNOR: The next thing on the program is the report of the Committee on Roads and Road Laws. Is that Committee ready to report?

Mr. Knuppenburg then read the following report:

## REPORT OF THE COMMITTEE ON ROADS AND ROAD LAWS.

By D. A. Knuppenburg, *Chairman*

The State of Pennsylvania is now undergoing a complete change, not only in the matter of constructing roads, but also in the laws governing their maintenance. To say that there is no need of all this change would not be true. The road that answered the purpose so well one hundred years ago is not the ideal road of to-day. Conditions have changed, and we no longer seek the highest points in order to get hard ground for a road foundation, or pass some improved land, house or spot of cleared ground. We rather look for suitable grade, then build a road and let the people come to the road in place of covering every hill with a road. Men's views are changing and so are the roads.

There seems to be two ways of looking at the benefits to be derived from having improved roads. The point of view of the majority of farmers is that they are imposed upon by being compelled to make and maintain good roads for the exclusive use of the city man with his automobile. It has been said by the automobilists: "You farmers are cowards and more afraid than your horses." But even if it be so, have the farmers no cause to be afraid in view of the many serious and fatal accidents that are occurring almost daily throughout our State? A horse accustomed to automobiles in the city will scare at them in the country, and the farmers ask "What are we to do?" It is a fact that during the last two summers our old men, our wives and our daughters have been deprived of the use of public roads. Formerly they could drive to the towns to do their shopping and dispose of butter, eggs and small fruits, and visit neighbors. Now all that is changed. It seems, therefore, that the only way for country people to travel on the roads with absolute safety is to walk, and this is precisely what a rich automobilist suggested that they do. The automobilists drive over the roads merely for their own pleasure, while the farmers are obliged to travel on business. Again, the farmers are taxed heavily to keep the roads in good condition, and just at the season of the year when they could travel over them with pleasure and profit they are practically driven away by locomotives or rubber-tired wheels driven by careless and incompetent hands.

It is not our intention to take into consideration only one side of the question; this being a free country, the man with the automobile has rights that should be respected. We should also not lose sight of the fact that the manufacture, repair, and operation of automobiles give employment to many thousands of the working people. The automobile trade has reached the enormous sum of about $40,000,000 annually and has come in a very short time to a prominent position among the industries of our country. Further, there is a large amount of money distributed annually throughout the country by tourists, who, being usually people of wealth, are willing to pay, and do pay, generously for their entertainment while passing here and there throughout the land. This, of course, does not absolve automobile owners from their duty toward others. We believe the auto is with us to stay and we recommend that a tax be placed upon it that will be felt in the construction and maintenance of our roads. It is the lawless, reckless, heartless few who cause fear, suffering and death to so many. We therefore recommend more stringent laws governing the use of automobiles on our country roads. By the swift-moving wheels of the automobile the dust and small stones are lifted and thrown from the surface of the road, leaving it bare, rough and in need of repairs. (We refer to improved State roads.)

Road building in Pennsylvania is a great problem; we have no sooner solved one part of it than another, equally as perplexing, confronts us. The one to be attacked next is how to prevent the speedy deterioration of improved roads by the removal of the cushioning coat of screenings and dust which is needed to prevent the stone below from exposure to the grinding action of the wheels. This is an excessive damage caused by automobiles, and is too thoroughly established to admit of doubt. We find some road-builders viewing with a degree of alarm almost akin to consternation the suddenly increased cost of maintenance of their roads. Mr. Beman, of Harrisburg, Pa., in a paper read at Springfield, Mass., Sept. 24, 1907, said, "I believe that instead of a curse the automobile is a blessing in disguise, for I am firmly convinced that its coming will stimulate the search for a method of obtaining a dustless road. The ultimate result will be a road from which each passing breeze or each summer shower will not remove the fine particles of stone. The consequent enhanced durability will in the future reduce the cost of maintenance, even below that existing prior to the advent of the motor car, as there will be less rapid loss of material from the road surface than before the days of the automobile." About $60,000.00 revenue was received in 1907 from automobile licenses, which, if applied to roads, would not settle the dust.

We would like to call attention to loose stone being allowed to remain on our country roads. If the law could be rigidly enforced in regard to this, it would be of untold benefit to the public. Again, it the law could be amended so as to permit the use of crushed stone and a heavy road roller on country roads with State aid and supervision, an immediate and practical benefit to the masses would be the result.

We feel that the time is near at hand when the principle of State aid will be extended in its application so that the Commonwealth will assist in improving the condition of the ordinary dirt roads. In New York we find that the State is giving considerable aid to the dirt roads and we, in Pennsylvania, cannot afford to be far behind in carrying still further the State aid plan. We commend the State aid system of constructing high class stone roads, but believe that this is only a portion of the work which the Commonwealth will be found undertaking in the near future. In addition to the construction of macadam roads a system should be devised by which part of the burden now resting upon the townships in the care of dirt roads can be assumed by the State. The present State aid law in fact does take a small step in this direction in the provision contained in it by which the State Highway Department is required to furnish advice and information to township supervisors. We find that the Department has shown a disposition to interpret this section of the law in a very liberal manner, and that many townships in the State have been furnished free of charge, by the Department, with working plans for bridges and culverts and with assistance and advice on many such points. State Highway Department engineers are sent without cost to the township to examine the sites of proposed new bridges in order to be able to give intelligent and proper advice and prepare plans for permanent structures. All of this work is a distinct advantage, apart from the actual improvements which are thus constructed. If at any future time the further improvement of a highway on which such bridges may be located may be undertaken, the expense then incurred will be lessened by the cost of whatever permanent bridges and culverts are now being built under the present system by which these plans are furnished without cost to the townships.

The use of wide tires should be encouraged in all possible ways and we would even favor legislation by which a gradual change from narrow tires to wide tires could be brought about. We of course could not favor legislation which would work a hardship upon the owners of narrow tires, but it would seem easy to devise a method by which the wide tire could be substituted for a narrow tire as the years go by until eventually we would find nothing but the wide tire in use. The benefit of wide tires has been too firmly established to admit of doubt in the mind of any person who has investigated this subject. It is true that there are still some who cling to their faith in the merit of the narrow tire, but their number is steadily decreasing and we must sooner or later reach a point where we can take another step in advance and do away forever with the narrow tire.

It has come to our attention that in some townships where improved State roads have been built the supervisors have neglected them to their serious damage. It is folly to suppose that a macadam road will never need any repairs. There is no implement which we use which does not need repairs at some time or other, and it needs no argument to show that the longer needed repairs are neglected the greater will be the expense involved when the repairs are actually made. It is folly to expend large sums of money in giving improved roads to a township if the men who are charged with their maintenance are so blind to the interests of their township that they do not keep the roads in proper condition. Such wilful neglect of their duty should be severely dealt with or some method devised by which necessary repairs will be made when needed.

We deeply regret that the bill passed by the last Legislature relative to the duties of township supervisors and the collection of road taxes failed to become law. It is not our purpose to attempt to consider all the features contained in that bill, but for our present purpose it is enough to say that it contained many features vastly superior to those of the supervisor law of 1905, and if it had been allowed to take its place on the statute books we believe it would have been hailed throughout the entire State as one of the most progressive and at the same time most satisfactory laws of recent years. Under this bill a nominal payment to supervisors was authorized so that they would no longer be required to give their services to the townships without compensation. The one dollar additional tax was also abolished by this bill and provision made by which the State was to pay in cash to the townships a sum equal to 50 per cent. of the road taxes which they collected. It is to be hoped that the next Legislature will re-enact some measure which will contain some of the features of this bill. Referring again to the State aid system of improving roads, we find that during 1907 there were completed about 200 miles, making the total length of roads improved by the State since the State Highway Department began its work in 1904 about 450 miles. We are informed by the Department that they have on file applications for nearly 3,500 miles of roads and that in order to build this amount the present appropriation will have to be increased fourfold or more. We believe that the Commonwealth can do no better with the millions which it annually receives than to expend a large portion of it annually in ways which will directly benefit so many of the common people of the State as does the improvement of its highways.

The GOVERNOR: Any discussion on this paper?

MR. SEXTON: This Board has always been interested in road making. I remember some fifteen years ago we took up the question of good roads, but nothing was done. However, it was the entering wedge that has brought about the improvement in our public highways that we have just entered upon. I say just entered upon. This great Commonwealth of Pennsylvania, with its wonderful resources, has just commenced to improve our public highways. We admit that we ought to be ashamed of ourselves when we think of the little State of New Jersey just across the river, which has completed within that time between twenty-four and twenty-five hundred miles of macadam road. Now, we are glad that we have started out, even if we have done nothing else. The miles that we have built are only samples—object lessons in the art of road making. We are distributing in the different townships, and along our public highways samples of roads as we want them. Of course, we want them to be permanent, but we are simply teaching the different townships how to do it. The Department of Highways has been, I think, unjustly criticised along many lines. They are just starting out, and have many things to learn. I am rather glad to know that the automobilist has come into the State. They are an active people, and they have money back of them, and influence, and they have brought it to bear on our public roads. They must drive more carefully than they have been doing; if they don't, we must teach them, but they have been an influence for good in our public highways. Senator Critchfield has helped on this movement of good roads. He stood behind us, but we must remember that it was not the farmers but the man of finance who stood behind us. The farmers have learned since, and are beginning to come in and help the movement on; they are learning that there is nothing that will tend to the improvement of our agriculture, and to its permanent upbuilding, more than good roads. Now, the automobiles come to us, and they say "we must have good roads," and they have lots of money behind them, and they do not object to paying the heavy taxes, and that will help us out. Now, fellow-members, I think it is the duty of our Board to hold up the hands of the State Highway Department; let us do it. Don't let us handicap them by unjust criticism. Now, Mr. President, I hope to see this good work go on. I don't hope to live to see many miles of improved roads, but I shall be glad to know that the improvement is going on, even if I do not live to see the number of miles of improved road that they have in New Jersey.

## ADDRESS OF THE GOVERNOR.

I came in here to stay half an hour, but these discussions have proven so interesting that I will stay as long as I can. The last two papers have been very interesting to me as Chief Executive of this State. The agricultural interests of this State are entitled to the greatest credit. As far as the centre of our great industrial industries is concerned, they are the force that helps to make the great cities. The coal interest, and the manufacturing interest will, however, in time pass away, but the great agricultural interests we have always with us. As one of the gentlemen has said, the State that increases its agriculture increases its prosperity, and I am sure that holds true of Pennsylvania.

Now, as to the question of appropriations, I feel that when a man holds an official position, he must expect to have his official actions criticised by the people whom he represents, and at this time I represent officially the entire State of Pennsylvania, outside of any politics or anything else. Now, as to the question of appropriations: I know it is a great disappointment to communities and to those interested in the bills that come from the Legislature to the Executive for his signature, when he finds that he cannot grant that appropriation. But this question of appropriations is merely one of many that confront the Executive. It is merely a question as to whether there is enough money to carry it out. I did not intend to talk about this, but the last Legislature appropriated something like $71,000,000. It was rumored through the State that there was a surplus of $15,000,000, and I thought so with the rest, but I want to say right here that I don't believe in any great surplus in the State; any surplus there is should be used for the benefit of the people by whom it is contributed. I believe the keeping of so large an amount of money a just cause for criticism. I am not reflecting upon the Legislature; the Legislature—this last Legislature—has been, I think, as good as any Legislature the State ever had, but they sent to me appropriations approximating $71,000,000, and I then sent for the officers whom I have for the purpose, to inquire "what is the anticipated revenue for the next two years, so that I can base on it the bills I have to sign?" Instead of having a surplus of $14,000,000, while there was in the treasury $14,000,000, there were outstanding against it claims that included the school fund and Superintendents' salaries all over the State, amounting to about $7,000,000. In other words, the State was in the position of a man who, having in bank $10,000, has outstanding checks, not yet presented, to the amount of $5,000. We had a bank account of $14,000,000, but outstanding checks against it of $7,000,000—a trifling amount, but a very important one. After the officers told me that, I asked for the receipts of the next two years, including the $7,000,000, and I found it was between $46,000,000 and $47,000,000, and I was to sign bills appropriating $71,000,000. Now, it is only the exceptional business man who is allowed to overdraw his bank account. It might be desirable, but it would be unwise for the bank to allow it, and so, if I had the greatest inclination in the world, I could not sign those bills appropriating almost double our anticipated income for the next two years. I had to cut the appropriations and one of the bills cut in this manner was the good roads bill. Now, I believe that the road laws are one of the most important things in the country. One of the things the Executive has to consider in signing appropriations is the question of the greatest good to the greatest number. Now, there is nothing of more importance to agriculture than good roads, but you can't do it all in one year, nor in two years, nor even in three or four years. You go to England and Scotland, and you find good roads, but they were not built in a year, nor even in a few years; but it is the result of the effort of many, many years. It is the greatest interest co the commen people that we must look for.

Now, as to the automobile, I don't own one, not because I don't like it, but because I feel that I cannot afford to own one. I suppose I am somewhat in the position of the young man of whom his father said "My boy has certainly succeeded in the automobile business." "Why?" said the other man, "I didn't know he owned an automobile." "Oh," said the father, "he don't, but he is the town constable, and he sweeps them in." I don't want to say anything against the automobile, but I do think they are very hard on State roads. When they run fifty or sixty miles an hour, usually the latter, they take a good deal of the road with them. Now, in New Jersey they certainly have fine roads, but they started fifteen or twenty years ago. And you must remember that Pennsylvania, in addition to building good roads, appropriates the largest amount of money to the public schools of any State in the Union. Now, when it came to a choice between the public roads and the public schools, I decided to cut the appropriation to roads, and let the schools stand, because the roads can wait until the boy is educated, if necessary.

The question of State matters is a new one to me, and while I am constantly learning, I have perhaps to-day learned more than I have in a long time, and I am willing to help anything that I can, not only in the matter of good roads, but in everything else. We are doing great things in Pennsylvania to-day. In addition to being the foremost State in the matter of appropriations to public schools, we are waging, as you know, a strong fight against tuberculosis, and that in itself is a great thing. It is not only the cause of large mortality in the human family, but it is the one thing that the farmers of our country have the most trouble with. To study and to fight this scourge, the State has appropriated $1,000,000, and if we can fight it, as I am informed by practical scientific men that we can do, it will be a wonderful thing.

I don't want to detain you any longer; I have talked longer than I attended. I will go with you hand in hand to make such appropriations as will be of interest to the farmers, and to the entire people of Pennsylvania. Another thing that comes to my mind is that we contribute more money to private charities than any other State in the Union. These are three great things to be foremost in: in our appropriations to the public schools, to the war waged against tuberculosis, and in the amounts appropriated for charities. But the question of good roads is coming up, and it will continue to grow, but I believe that it is better to build slowly and well; I believe it is better to build ten miles of good road that will last, than a hundred miles that will go to pieces in six months. And then there is another question comes up in connection with that. We can build the best roads, but they will go to pieces if they are not taken care of. Whose business it is to take care of them will have to be decided, as well as the question of the appropriation to build them. We must build the roads, and then find some one to take care of them.

The SECRETARY: I move the report of this Committee be received and spread upon the minutes.

This motion having been properly seconded, and the question put, it was so ordered.

The GOVERNOR: We are now ready for the next report—the report of the Committee on Fertilizers.

Mr. Schwarz then read the following report:

# REPORT OF THE COMMITTEE ON FERTILIZERS.

BY R. F. SCHWARZ, *Chairman.*

Your Committee on Fertilizers respectfully beg to report that while every effort which was thought to tend towards the getting of full information was made by your Committee, its report is not as full as it should be. One hundred and twenty requests for information, accompanied by paid return envelopes, were sent out to all the members of this Honorable Board, and to Institute managers, workers in the cause, and prominent farmers all over the State. Sixty-four replies were received and, be it said to the honor of this Board, fifty-three were from its members, while only eleven were received from parties outside the Board.

That the fertilizer question is regarded of great importance among farmers all over the State must be clearly evident to any one perusing the answers received by your committee, which answers are herewith respectfully submitted. Five questions were asked and answered by those replying and they were as follows:

About what amount of money was spent last year in your county for fertilizers? Definite answers to this query were received from but forty-three counties, these showing an expenditure of $4,824,000; but your Committee is convinced that, while these figures indicate an expenditure in the entire State of over $7,000,000, even this vast sum is an underestimate of the sum actually spent annually for fertilizers in Pennsylvania.

Is the use of fertilizers increasing or decreasing? Answers to this question show that in forty-three counties there was an increasing demand for fertilizers; in seven counties a decrease is reported, while in three counties the demand for and use of fertility in the bag seems to be stationary.

Is the tendency toward low-grade or high-grade fertilizers? This question was answered in forty-two counties for high and in twelve counties in favor of low grade, while two counties reported a stationary condition.

Do you think that the average farmer knows what he is buying when he puts his money in fertilizers? To this question forty-two counties answered "no," while five counties answered "yes," and the balance left the question answered.

Are you in favor of more stringent laws to protect the farmer in the purchase of fertilizers? The answer to this was almost unanimously "yes." The two answers of "no" were qualified by the statement, in one case, that there were too many laws already and only their enforcement was needed; in the other, that the only law needed was one making it compulsory on the farmer to study the fertilizer question.

From the answers received your Committee draws the following conclusions:

That by reason of the great amount of money expended for fertilizers in the State, it is the duty, and should be the constant endeavor of the Department of Agriculture to advocate and work for the passage of laws which will make the intelligent purchase of fertilizers possible to any farmer in our State. We fully recognize the fact that no law or laws will be of use or help to that unfortunately too large class of farmers who simply take the word of the agent from whom they buy and pay their money, or promise to pay it, without looking at the analysis of the bag they buy. While this analysis reveals only the commercial value, and not the plant food value of the contents of the bag, it is at present the only guide the law provides for.

Your Committee would suggest to the Department that the laws and requirements of the State of West Virginia, where affidavits are required to be filed by the manufacturers as to the source and degree of solubility of ingredients, and where all agents or dealers are required under penalty to send copies of their orders for fertilizers to the Director of the Experimental Station, are worthy of study. The Experiment Station there issues to the manufacturers tags on which is printed the analysis, etc., as contained in the affidavit filed, and when goods do not come up to the sworn statement, the manufacturer may be prosecuted for perjury. The Experiment Station charges forty cents per ton of fertilizer for the tags.

The law of Kentucky might also prove an interesting study, and your Committee particularly points to that part of the fertilizer law of Indiana which provides for printing of tags by the State Chemist, which tags are required to show only the minimum contents of fertility, thus doing away with the foolish, misleading figures allowed by our Pennsylvania law.

The practice at the Virginia station of publishing the solubility and probable plantfood value of all known ingredients of fertilizers is one the Committee would recommend for adoption by the Department of Agriculture of Pennsylvania. Such statement could easily be included in our present fertilizer bulletin.

We would also recommend that the analyses in Pennsylvania be made to conform to those of New Jersey, by requiring the State Chemist to reduce the temperature of the Citrate of Ammonia used to 100 degrees instead of 150 degrees Fahrenheit, as now used; this because analysis obtained by the use of the lesser temperature will and do more truthfully show the plant food which can really be made available to the growing plant.

Your Committee has been able to gather but little information as to the use of Floats, or simply ground concentrated Phosphate rock, but believe that the evidence so far at hand does not justify us in advocating their use in Pennsylvania soils, except where such soils contain ample stores of humus.

While your Committee realize that it is not possible to obtain all we ask for to safeguard the farmer, we would name the following points as of special importance in any new law:

First: Prevent the printing on bag or tag of all but plain minimum figures.

Second: Provide for some statement on bag or tag of the source of ingredients in the fertilizer, or at least for the establishment of some standard of solubility by the use of which the tag can show various degrees.

Third: Provide for an increased penalty for non-compliance with the law. The minimum fine of $25 and possible maximum of $200 does not seem sufficiently severe.

Fourth: Provide that the official analysis made by the State Chemist shall be sufficient legal evidence of the infraction of the law, where such analysis shows less value than the guarantee.

So far as your Committee are aware, no prosecutions for infractions of the present law have been brought, even though the last bulletin shows that during the period it records ninety-seven brands fell below the guarantee in Phosphoric Acid, one hundred and thirty-eight brands fell below the guarantee in Potash, and one hundred and thirteen brands fell below the guarantee in Nitrogen contents. Your Committee respectfully submits these facts for consideration. Knowing of the activity of the Department in the prosecution of violators of the Food and Foodstuff laws, we feel that some valid reason must exist for the immunity enjoyed by the dishonest fertilizer manufacturer.

The GOVERNOR: Any remarks on this paper?

MR. HUTCHISON: I move it be received and spread on the minutes.

This motion having been properly seconded, and the question put, it was agreed to.

The SECRETARY: I want to say something about what seems to be the present immunity of the manufacturer. Those of you who are not in touch with the work of the Secretary of Agriculture do not realize the difficulty of the work. We do not have force enough to send men out into the field to work up this matter, or to bring prosecutions. We hope, however, that we may be able before long to do this, because we have established a new department. Some few prosecutions have already been brought where the evidence was so great as to warrant it, and in every case that prosecutions have been brought, they have been sustained.

MR. SCHWARZ: That is a very good reason, Mr. Secretary, and that is the very point I brought out—that there must be a good reason for this apparent delay.

The SECRETARY: Most of the facts have never been published.

MR. HUTCHISON: I know of a great many prosecutions that have been brought, and have not been published. I am glad the Secretary made this point. I was going to make it myself if he did not. I am in charge of the prosecutions, and when a man who has violated the law tries to do better, it is only fair to give him a chance. If he does not, it is time then to punish him. I have known cases where, when we started the prosecution, the man would come after me, and beg me to let up on him. I generally tell him "it is the Secretary who is doing this; I am only his agent, and you have had years to come in under the law." Give these fellows a chance to do what is right.

The SECRETARY: The next item on the program is "Farm Help." Mr. Black has written me that he is unable to be here, and he has not sent any paper. As you will notice, we are behind with our program. The time for the noon recess is drawing near, and so, unless otherwise ordered, the subject of "Pure Blood Live Stock" will come up the first thing this afternoon.

MR. SCHWARZ: How about Dr. Hunt?

The SECRETARY: The first two numbers, the Committees on Wool and Textile Fibres and on Livestock, will not report; so there are only two reports, and then comes Dr. Hunt. There will be ample time.

MR. HUTCHISON: Now, gentlemen, as we are about to adjourn, the Governor will stand here, and as you pass out, pass this way, and he will shake hands with you. I move that we adjourn until 1.30 this afternoon.

This motion was properly seconded, and so ordered.

The Governor then took his stand near the door, and the members of the Board and visitors passed before him and had the privilege of shaking hands with the Chief Executive, after which the session adjourned until 1.30 p. m.

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Thursday Afternoon, January 23, 1908. 1.30 P. M.

Mr. Schwarz in the Chair.

The CHAIRMAN: The meeting will please come to order. We will now get down to the order of business. As I understand it, the Committee on Wood and Textile Fibres and the Committee on Livestock will not report. Next comes the report of Dr. Conard on Poultry.

The SECRETARY: Dr. Conard has been obliged to leave, and he said he would very much like to have the privilege of touching up his paper, and then sending it to the Secretary for publication. His paper will come in later.

The CHAIRMAN: Next in order comes the report of the Meteorologists; is Mr. Demain in the room?

Mr. Demain did not appear to be in the room.

The CHAIRMAN: Is Mr. Heacock here?

Mr. Heacock was reported not present.

The CHAIRMAN: Is Mr. Piatt here? We have not yet had his report on Forests and Forestry.

Mr. Piatt did not respond.

The CHAIRMAN: Then we will have next Dr. Hunt.

MR. HUTCHISON: Prof. Hunt wants to put up a few charts; will some one please come and help?

The SECRETARY: Mr. Chairman, while these charts are being put up, I will take the pleasure of saying that vouchers will be sent to the members of the Board, including the speakers. You will please fill up these vouchers and return them to this office. Under a rule of the Auditor General you will have to have receipts for everything over a dollar. It is not necessary to do so in the matter of railroad tickets; simply state the number of miles. That is all that is required with regard to that. This rule affects all departments. As the Department of Agriculture is one of the creations of the Legislature, it will be necessary to comply with this rule of the Auditor General.

Another thing concerning which I should like to have some expression from the members is as to the hours of session. You will notice that the program says we are to begin at nine o'clock and continue until twelve, then begin again in the afternoon at 1.30, and in the evening the hour of beginning is 7.30. Now, I see that some of the members seem to have difficulty in getting here in the morning at nine o'clock. I noticed that we were delayed quite a little while this morning, and we were also delayed quite a little while this afternoon; possibly it would be better if the hour fixed for opening in the morning were half-past nine, and then continue until half-past twelve, and then have a recess of from half-past twelve until two o'clock, and from then until five, giving us a three-hour session in the morning, and a three-hour session in the afternoon. Then begin at half-past seven in the evening, and continue until we get tired and sleepy. Now, this is a matter for the Board. In the preparation of the program so far, I have made it according to my idea, and that may not be right. I shall be glad to hear from the members of the Board on this matter.

And then there is another thing: You know in a matter like this, when a report is made by a Specialist, you do not always know when it will be most convenient for the gentleman to be here. Probably in preparing the program it would be well to have them fix the time at which it will be most convenient for them to speak, when securing their consent to speak. Another thing is that when a report is made by a Specialist, there seems to be a tendency to discuss it at length. Now, this is a very important thing, and these discussions are very interesting, but we have a very full program and the discussions often overlap the time they should take and interfere seriously with the carrying out of the program. Several speakers who were to be here to-day have not been able to come, so it leaves us just one subject behind on our morning program, but perhaps it would be as well to state the time allowed for the discussion of a certain subject in making up the program. I should like to have some expression from the members of the Board with regard to these matters.

MR. STOUT: I feel about this that we should give the Secretary the same privilege that he always had. I propose that we continue the making of the program and the hours of session in his hands without any suggestions from the members of the Board, the same as we have always done.

The CHAIRMAN: Do you make that as a formal motion that the Secretary be allowed to prepare the program and fix the hours of session of the State Board of Agriculture?

MR. STOUT: I do make it as a formal motion.

DR. HUNT: I second that motion.

The question being put, the motion was carried.

MR. STOUT: And I would submit it also by action of the Board that the Secretary be authorized to designate a certain time for the presentation of these papers and the discussion, and then state that time on the program.

The CHAIRMAN: Is that motion seconded?

MR. HUTCHISON: I second it.

The question being then put, the motion was carried.

MR. GLOVER: I have a Resolution to offer, Mr. Chairman.

The CHAIRMAN: We will listen to the Resolution of Mr. Glover:

MR. GLOVER: The Resolution I wish to offer is as follows:

"It having come to the knowledge of the Executive Committee that the present administration is exceedingly anxious, in the interests of economy, to curtail as much as possible public printing, we would therefore recommend that in the preparation of the report of this meeting for publication the Secretary shall cut out all matter that does not relate to, or that is not germane to, the subject of Agriculture."

I move the adoption of this resolution which I have just read.

The motion being properly seconded, and the question put, it was so ordered.

MR. HUTCHISON: Did the Memorial Committee make its report?

The CHAIRMAN: No; not yet. I suppose it will come later. Is Dr. Hunt ready?

DR. HUNT: After the excellent address on education to which we had the pleasure of listening yesterday, it is somewhat embarrassing to me to follow up the subject. I wish, however, to thank Prof. Hamilton for what he has done in calling our attention to what is being done abroad. A large part of the work of educating the adult by means of the living teacher is due to the fact that we have not properly educated our youth. When we have properly educated our youth, a large part of the work of a better agriculture shall have been done. I am to discuss with you this afternoon the education of our youth, and in doing this, it will be well to remember that the average boy and girl never get higher than the public schools. For this reason I am to speak to you on Agriculture in High Schools.

Dr. Hunt's address is as follows:

## AGRICULTURE IN SECONDARY SCHOOLS.

By Dr. Thomas F. Hunt, *State College, Pa.*

It is well to remind ourselves at the very outset that the most important problem in secondary education is not primarily the subject or subjects taught. If out of every ten pupils who enter the public schools only one enters the High School, it must be obvious that the question of first importance is not whether this or that subject should be taught or whether one kind of education is better than another, but the prime question is how to reach the nine boys and girls who now fail to receive the benefits of secondary education.

Two important factors in bringing about this result are inspiration and facilities. Education is dependent upon both ideals and opportunity. Going to a high school and later to a University was with the speaker merely a matter of accident or a chapter of accidents. Such educational resources were beyond the horizon of himself and his schoolmates. On the other hand, the idea of not going to college never seems to have occurred to his son as an educational possibility. To him and his schoolmates, raised in a University atmosphere, a college education is as much a part of their educational ideals as the sun is a part of the solar system.

Of course with inspiration must go opportunity. It goes without saying that as far as possible every boy and girl is entitled to equal educational opportunities. The greater the opportunities, moreover, the greater will be the inspiration and the demand. It is for this reason that higher education grows like a snowball. The larger it becomes the more snow it gathers.

This much has been said in order that in the discussion which follows on agriculture in the secondary schools the wrong emphasis shall not be put upon the subject. The purpose of schools is not to teach subjects but to teach boys and girls. Subjects are incidental to so training boys and girls that they will be able to live the fullest possible lives. When I look over a group of educated men, say for example a college faculty, and reflect that no two of them were trained alike, that in many cases the kind of education has been as wide apart as the north and south poles, although the amount may have been substantially the same. I am compelled to conclude that it is not essential that men and women should pass through the same educational cider press in order to succeed in life or to be of the highest service. It also gives me quite a different view concerning entrance requirements. But that is another story and to discuss it here might lead us astray. All that is needed to be said here is that we need to inspire boys and girls with a desire for knowledge and culture and not put unneccessary difficulties in the way of their obtaining it.

Says President Roosevelt, in his speech at the fiftieth anniversary of the founding of the Michigan Agricultural College:

"Book learning is very important, but it is by no means everything; and we shall never get the right idea of education until we definitely understand that a man may be well trained in book learning and yet in the proper sense of the word and for all practical purposes be utterly uneducated; while a man of comparatively little book learning may, nevertheless, in essentials have a good training." Every student of education knows this is true, but I sometimes think some of us do not give it time to soak in. It is not the purpose this afternoon, therefore, to consider the desirability of teaching agriculture and related subjects in high schools and other secondary institutions, but to study the evolution of this movement as a basis for discussion the best method of introducing agriculture into these schools in Pennsylvania. Dr. Schaeffer has said there are 301 township high schools in Pennsylvania and that agriculture must be placed in every one of them. How may this best be accomplished? How can we get down to business?

The Land Grant Act of 1862, which provided for the teaching of agriculture and mechanic arts, established in each State a college. When this act was passed, the term college had a definite meaning, which clearly differentiated it from an academy. Notwithstanding this fact, however, a number of the colleges in this country have been so far as their entrance requirements are concernd, little or none above those of secondary schools. Such colleges have had a greater number of teachers and larger facilities, especially in the way of laboratories, than those possessed by ordinary high schools.

That they have done a somewhat higher grade of work than is possible in an ordinary high school is probable. Neither criticisms nor comparison is here intended. The point is that for many years secondary education in agriculture has been an accomplished fact in this country. Almost all the agricultural colleges have recognized the demand for secondary education by permitting students with less than college entrance requirements and sometimes without entrance requirements of any kind to enter and take such studies in agriculture and allied branches as their previous training would permit. In some instances the students have entered the classes with regular students and in other cases separate classes have been organized. Not infrequently such students subsequently make up their entrance requirements and graduate. Some of the best men the colleges have turned out have been of this class.

Not only have students been permitted thus to pursue studies throughout the year, but in most institutions winter courses, usually varying in length from eight to twelve weeks, have been organized. These courses have usually been very much specialized, students often giving their entire time to some branch of agriculture as dairying, poultry, husbandry, etc. The pioneer in this work was the University of Wisconsin when, in 1890, Dean Henry organized the first winter course in dairying. While it is true that pumpkins can be grown in three months and oak trees require thirty years, it is also true that these winter term courses not only give useful knowledge and much inspiration but also have pedagogic value when in the hands of real teachers.

The following testimonials are not without interest in this connection.

"I owe my success to the Short Course, and I doubt whether I would be on the farm to-day had I not taken that course."

"The Short Course has increased my earning capacity 25 per cent."

"We consider the time spent in Madison at the Short Course as two of the best spent winters of our lives."

"Farm work is much more interesting to me since taking the Short Course in Agriculture. Work that was once a drudgery is now a pleasure."

"I feel that the money spent in the Short Course is the most profitable investment I have ever made."

"We have added from 40 to 45 per cent. to the production of our farm by practicing a thorough system of crop rotation. I have learned how to care for live stock, and we have increased our number 25 per cent. and the quality of our animals 60 per cent. Our dairy herd produces easily 50 per cent. more than it did before I took the Short Course."

"I am unable to express the value of the general surroundings and environments of the University, and habits formed while there. The longer I am away, the clearer do I see the results. The cost is trifling when I spread it over my life, as the advantages obtained will always remain with me."

It should be noted here that the students in the short winter courses have not generally been persons of high school age, but have been older students often with some high school preparation. We must, I think, recognize age as a factor in mental development entirely aside from scholastic training.

Professor Henry says: "The short course is not successful with young men under 20 years of age and those who have had no practical farm experiences. But it succeeds splendidly with boys who have completed the district school work and who have been partners, as it were, with their fathers in farming or who have actually run farms themselves. There is all the difference in the world between lads who have never had any care or responsibility in their lives and those who have carried such responsibility."

The next step in the evolution of secondary instruction in agriculture was the organizing of definite separate secondary schools within the agricultural colleges themselves. The first separate school of this type was organized in the University of Minnesota and is known as the Minnesota School of Agriculture. This institution offers a three years' course of six months each, November to April inclusive, thus enabling the boys and girls in that state of long winters and short summers to be on the farm during the greater part of the growing season.

The school was established in 1888. The total attendance in the regular course in the school since its opening has been 4,283 students not counting any duplicates. There have been 870 graduates, of whom 197 were young women.

Special industrial schools have been established in several states as in Alabama, Georgia, Maryland, New York, and Wisconsin. These schools place principal emphasis upon instruction in agriculture, manual training and home economics, while the ordinary high school subjects, as such, are made incidental. Perhaps the most important schools of this type are those in Wisconsin. In 1901 the Legislature of Wisconsin enacted a law authorizing counties to establish secondary schools of agriculture and domestic economy and providing that the State shall pay each county maintaining such school a sum equal to two-thirds the amount actually expended for maintaining such school during the year, provided that the total amount so apportioned shall not exceed $4,000 to any one school in any one year.

In 1902, two schools of this class were established, one in Menomonie, Dunn County, and the other in Wausau, Marathon County. Students are admitted directly from the rural schools. The regular course consists of two years, of eight months each. The tuition is free to students of the county. It is reported that there was a good attendance at the opening of each school, which has steadily increased each year.

This movement for specialized secondary industrial schools, including agriculture, mechanic arts and domestic or household science, has attracted widespread attention. Besides being under consideration in several State Legislatures, there was introduced January 22, 1907, in the National House of Representatives, by Congressman Davis, of Minnesota a bill (H.R. 2,475), to provide an annual appropriation for industrial education in agricultural high schools and in city high schools, and for branch agricultural experiment stations.

The bill provides for an appropriation "to each State and Territory for the maintenance of instruction in agriculture and home economics in agricultural high schools of secondary grade and instruction in mechanic arts and home economics in city high schools of secondary grade a sum of money equal to ten cents per capita of the population of each State and Territory." The bill further provides that the funds thus appropriated shall be used only for instruction in agriculture, mechanic arts and home economics, and that all states and territories and all schools accepting these funds shall provide other funds with which to pay the cost of providing the necessary lands and buildings and of instruction in all general studies required to make well-rounded high school courses of study.

The bill further provides that each agricultural high school may maintain a branch experiment station for each of which the federal government will appropriate annually $2,500, provided the State Legislature appropriates an equal amount.

It will be seen that if the State of Pennsylvania has a population of 6,000,000 that this means a federal appropriation of $600,000 annually for secondary education in agriculture, mechanic arts and home economics, to say nothing of the money appropriated for the branch experiment stations. In addition money must be provided by the state or otherwise for the necessary lands and buildings and for the instruction in all general studies required to make well-rounded high school courses of study.

The significance of this bill may be best realized by giving a brief account of what the federal government has done heretofore for agriculture and mechanic arts.

In 1862 the first Morrill Act was passed, apportioning to each State 30,000 acres of public land for each Senator or Representative in Congress to which the states were respectively entitled, for the endowment, support and maintenance of at least one college. This apportionment was, therefore, in proportion to the population of the several states. Pennsylvania derives $30,000 annually from this Act. The second Morrill Act passed, in 1890, appropriates $25,000 annually to each state, and the Nelson Amendment, passed in 1907, adds $5,000 annually, and this amount until it reaches $50,000. The Hatch Bill, passed in 1887, establishing the experiment stations, appropriates $15,000 annually, while the Adams Act passed in 1906, added $5,000, and to this amount will add $2,000 annually until the amount reaches $30,000.00. The total appropriation from the federal government for higher education and for the Experiment Station in a few years will amount to $110,000, while the appropriation for secondary education will amount to $600,000 or $700,000 annually should the Davis Bill become a law. It will be noted also that all these appropriations except in the case of the first Morrill Act, make the same appropriation to each state without regard to its size, wealth or population, but the Davis Bill, like the first Morrill Act, apportions the money in accordance with the population of the several states. That we may better understand the full significance of such apportionment it may be pointed out that the people of Pennsylvania, assuming they are average people in their consuming power, are contributing to the support of the national government about $80,000,000 annually. Pennsylvania contributes annually about $15,000,000 to the support of the Army and Navy, or more than half as much as the cost of the whole State government and twice as much as the State appropriation to the public schools. Twice as much for national welfare as for State education.

This bill differs from the Morrill Acts in another way. The first Morrill Act provides for the teaching of scientific and classical studies and military science. The second Morrill Act provides for instruction in the English language and the various branches of mathematical, physical, natural and economic science. The report of the Commissioner of Education for year ending June 30, 1905, shows the expenditure of the federal funds of the Land Grant Colleges to be as follows:

Agriculture, 16.8.
Mechanic Arts, 29.6.
English Language, 12.4.
Mathematical Science, 11.8.
Natural and Physical Science, 23.2.
Economic Science, 6.2.

The Davis Bill provides, as previously stated, that the federal funds appropriated for secondary education shall be used only for instruction in agriculture, mechanic arts and home economics, while the instruction in all general studies required to make well-rounded high school courses of study must be provided from other funds.

While this movement has been going on for specialized secondary agricultural or industrial schools, another movement has been in progress looking to the introduction of agriculture into high schools substantially as they exist to-day. The persons who are agitating for secondary education in agriculture may be divided into three classes: (1) those who favor the specialized industrial or agricultural high schools as above-mentioned; (2) those who do not believe in agricultural high schools any more than they believe in Algebraic High Schools or Botanical High Schools, but who believe that agriculture is a subject which may be taught in any high school to any student, just as Latin, or geometry, or physics may be taught; (3) the third class are those who favor both classes of schools, namely, the specialized agricultural high school with a trained faculty of experts, and the ordinary high school with agriculture taking its place with other subjects.

The argument with some is that the specialized high school is a phase of our educational development and is necessary for the purpose of creating interest and enthusiasm and for the purpose of working out satisfactory systems of instruction; that when these special schools have demonstrated their usefulness and place in the educational system, then the ordinary high schools of the country will adopt such form of instruction as has been proved best adapted to their needs.

It is a mistake to believe that the same system of education will work equally well in all places. What may be best for Georgia or Minnesota may not be best for Pennsylvania or Massachusetts. I hold, however, that any system of education is faulty which does not permit boys and girls between the ages of 14 and 18 to sleep at home. At that age the boys and girls not only need their parents, but what is perhaps no less important, the parents need the boys and girls, and any system of education which looks toward the breaking up of the home life at these ages cannot be looked upon as ideal. What is needed is a high school within sleeping distance of every boy and girl of high school age in the state. In each of these high schools every boy that wishes to do so should be able to get some knowledge that will fit him directly for performing successfully the most important duty of every man, viz., earning his daily bread, and every girl should receive training in home economics whether she wishes it or not.

It is high time that we abandoned that educational ideal that there is something unclean in preparing a boy or girl to earn a living. One of the greatest college Presidents of this country recently said: "The educated man who cannot earn his own living is not worth his education." President Roosevelt in the address to which earlier reference was made said: "No one can look at the peoples of mankind as they stand at present without realizing that industrial training is one of the most potent factors in national development."

"By the tariff and by our immigration laws we can protect ourselves against the competition of pauper labor here at home; but when we contend for the markets of the world, we can get no protection, and we shall then find that our most formidable competitors are the nations in which there is the most highly developed business ability, the most developed industrial skill; and these are the qualities which we must ourselves develop."

Although perhaps less progress is being made in the introduction of agriculture into existing high schools than in the establishment of specialized agricultural high schools, yet some progress is being made. Dean Price, of the Ohio State University, states that about fifty high schools in Ohio have introduced agricultural instruction.

One difficulty with the introduction of agriculture into the high school has been that high schools prepare students for college instead of for life, and although the smaller part of them go to college, the students themselves have insisted upon subjects which would permit them to enter college. In New York, the State Education Department has met this situation by announcing a syllabus on agriculture upon the completion of which regents credit is given as for any other subject. This syllabus is designed to occupy three periods a week throughout the year, and it is recommended to be given in the sophomore year, following the course in biology in the freshman year. As far as I know, no high school in New York has introduced this syllabus into its curriculum. Among other reasons, doubtless, on account of lack of teachers to teach the subject. This brings us to the question of how this subject is to be taught if introduced into the high school.

In 1895 the Association of American Agricultural Colleges and Experiment Stations appointed a committee on the methods of teaching agriculture. This committee has made annual reports to the association covering various phases of agricultural education. The seventh report is on secondary courses in agriculture in which the committee shows that agricultural courses may be offered in the high schools without any violent or radical reorganization of existing programs for such schools. A number of existing high school programs in different parts of the country were studied, and a tentative agricultural course for a number of these was suggested. The following, selected from the number is a simple form of high school course prepared under the direction of the State Superintendent of Public Instruction in Indiana and recommended for use in that state in high schools where at least two teachers are employed in high school work exclusively. Running parallel to this course the committee has prepared a tentative agricultural course, which presupposes an additional teacher.

## PROGRAM FOR HIGH SCHOOL IN INDIANA.

### FIRST YEAR.

| General Course. | | Tentative Agricultural Course. | |
|---|---|---|---|
| Algebra, | 5 | English, | 5 |
| English, | 5 | Algebra, | 5 |
| Latin, | 5 | Plants and their cultivation (i. e., botany, general and economic), | 5 |
| Physics or chemistry, | 5 | Physics, | 5 |

### SECOND YEAR.

| | | | |
|---|---|---|---|
| Algebra (one-third year), | 5 | English, | 5 |
| Geometry (two-thirds year), | 5 | Algebra, | 5 |
| English, | 5 | Geometry, | 5 |
| Latin, | 5 | Animals and their management (i. e., zoology, general and economic), | 5 |
| | | Chemistry, | 5 |

### THIRD YEAR.

| | | | |
|---|---|---|---|
| Geometry (two-thirds year), | 5 | English, | 5 |
| Elective† (one-third year), | 5 | Geometry, Latin or German, | 5 |
| English, | 5 | Agronomy (with special attention to local crops), | 5 |
| History, | 5 | History, | 5 |

FOURTH YEAR.

| | | | |
|---|---|---|---|
| Elective,† | 5 | History, | 5 |
| Zoology or botany, | 5 | Political economy, | 5 |
| Latin, | 5 | Zootechny and dairying, | 5 |
| History, | 5 | Latin or German, | 5 |

*With each subject, the number of recitation periods per week is given.

†Mathematics, physical geography, oratory, or advanced physiology.

The question is not whether either of these courses are perfect or even logical, but whether it is possible to introduce into existing programs of recognized standing, agriculture instruction without a radical departure from existing conditions.

It was suggested by the Committee that with the introduction of agriculture into high schools of this kind, the division of studies among three teachers might be as follows:

A. English, Latin and German.
B. Chemistry, Botany, Zoology and Agriculture.
C. Physics, Mathematics, History and Political Economy.

The Committee further states that Teacher B should be an Agricultural College graduate and would ordinarily be a man who might be principal of the school, while teachers A and C would ordinarily be women.

Concerning the value of the instruction the Committee has this to say:

> "Whenever the manual arts or the natural sciences are largely introduced into high-school courses the practical effect is to reduce the amount of time given to the ancient and modern languages. With improved instruction in English and science the effect of this on the general training of the student is not as marked as it might otherwise be, and whatever the theoretical pedagogical value of instruction in ancient or modern languages, there is little doubt that when a choice has to be made between these subjects and those which relate directly to the pursuit by which the pupil is to gain his livelihood, it will in most cases be desirable that he shall choose the things of most direct benefit in his life work. That it will not always be necessary for the student of agriculture to entirely neglect the study of at least one ancient or modern language in this high-school course, provided his tastes or attainments lead him in that direction, may be seen from examination of the programs of courses presented herewith."
>
> "This is believed that the presentation of schedules as above justifies the assertion that it is entirely practicable to adjust an agricultural course of high-school grade to existing high-school schedules and to make this agricultural course fairly satisfactory for the purposes of general training, as well as elementary instruction in the theory and practice of agriculture. The graduate of such an agricultural course may fairly be expected to understand the scientific basis of improved agriculture and to have an intelligent appreciation of the needs of a progressive agriculture. He will then be in position to profit by the results of the investigations of the experiment stations and by the information regarding the progress of his art which may come to him from the more intelligent of his neighbors, farmers' institutes, and good books and journals. He will be likely to become an intelligent and progressive farmer as well as a refined and useful citizen and home-maker."

The Committee on Methods of Teaching agriculture were, however, painfully aware that if progress in the introduction of agriculture in high schools was to be made, the subject matter must be put into pedagogic form adapted to the needs of the high school pupils. This has been done in some measure by the preparation of two syllabi. One is entitled exercises in elementary agriculture with a substitute plant production, written by Dick J. Crosby, and the other is entitled a syllabus on Agronomy for Secondary Schools, written by Professor G. F. Warren. These are intended as laboratory guides or manuals for the use of the teacher and not as textbooks to be studied by the pupil.

The pamphlet on elementary agriculture consists of 54 exercises on such subjects as

How roots absorb moisture.
To show that plants get food from soil.
To show the rise of water in plants.
How plants grow.
Seeds, germination test; purity test.
To show how young plants get food from seeds.
To make soft cuttings; hard cuttings.
Cleft grafting, whip grafting; budding.
Conditions essential to plant growth, light, heat, moisture, air.
Classification of soils.
Air in soils.
The effect of lime on soils.
Temperature of soils as affected by color.
The influence of tillage and mulches on the retention of moisture in soils.
Influence of drainage upon plant growth.
Selection of seed corn.
Field study of loss from poor seed corn.
The feeding value of corn.

This report was prepared primarily for distinct schools below the high school grades, but in many parts of the country, especially in the South, this set of exercises might well find a place in high schools of the more elementary type.

Your attention is next called to the syllabus on Agronomy for Secondary Schools. If the tentative agricultural course which has been presented be examined it will be noted that this course provides for instruction in botany and physics in the first year; zoology and chemistry in the second year; agronomy in the third year and zootechny and dairying in the fourth year. Since these terms, agronomy and zootechny, are comparatively new, it may be well to pause here long enough to give a few definitions. Agriculture may be defined as the science and art of producing living things. There are two classes of living things, namely, plants and animals. The science and art of producing plants is, therefore, agronomy, while the science and art of producing animals is zootechny or animal husbandry. Botany studies the fundamental laws of plant growth: agronomy studies the economical application of these laws. Zoology in like manner classifies animals: zootechny studies the production of those useful to mankind. It is obvious that much of the usefulness of botany and zoology will depend upon the point of view from which it is taught.

Referring again to this tentative course in agriculture it will be seen that this syllabus on agronomy is intended to cover the crop producing side of agriculture and may occupy a year of study throughout the year, preferably, perhaps the junior year, in order that the student should have first studied botany, chemistry and physics. Of course I am aware that here is opportunity for endless discussion, but order of subjects is not an essential part of this discussion, and in any case I am convinced that the order of subjects is not a cast iron matter and that much depends upon the point of view with which the subject is presented.

The syllabus on agronomy is more than a syllabus; it is a set of daily instructions to the teacher. It tells the teacher whether on a given day the exercise is to be a recitation, a demonstration lecture, a laboratory exercise or a field excursion. It gives a brief outline of the subject matter and refers the teacher to bulletins or books containing the subject matter in question. If a demonstration lecture or a laboratory exercise it states precisely the materials and apparatus required.

This syllabus recognizes four kinds of exercises, namely, recitations, demonstration lectures, laboratory exercises and field excursions.

The following is a sample of the field excursions:

10 (3) Field Lesson. Relation of crops to types of soil, plant roots, nodules on legumes. Materials. Rule, spade.

(a) Go across several farms. Notice what kinds of crops are being grown on sandy soils, on clay soils on wet land. Some crops can be raised on a great variety of soils. Thus, timothy hay can be grown successfully on clays, clay loams, and loams, or even on fine sand, but it usually does best on the clay or clay loams. Peaches usually thrive best on fine, sandy soils. White or Irish potatoes require a loose, moist soil for their best development. To what extent are the crops varied with the kinds of soil in your region?

(b) Dig down beside a cornstalk; notice how deep it is to the first roots; to the deepest roots. Repeat in several places and on different kinds of soil, if possible. How deep could a cultivator go without hurting the roots? Similarly, find the depth and lateral extent of roots of clover and other crops. As the roots decay they add to the humus and make the soil more productive. What plant roots examined would tend to deepen the soil and be most valuable as they decay?

(c) Carefully dig up a clover plant; look for nodules on the roots. Bacteria live in these nodules. By means of these nitrogen is taken from the air in the soil and is made available for plant use. Nitrogen is one of the most important foods for plants. It is the most expensive part of common fertilizers. Only members of the pea family (legumes) are capable of thus getting nitrogen. Why does clover benefit a crop that follows it? Consider the depth and amount of roots as well as the nodules. Dig any of the following or other legumes that you see and look for nodules: White clover, sweet clover, beans, peas, vetches, alfalfa, etc. Later lessons will consider this topic again. (Farmers' Bul. 215, p. 15; Experiments with Plants pp. 133-135 and 149; Physics of Agriculture, pp. 150-157.)

Then follows two recitations covering this subject.

Next a laboratory exercise is selected for illustration which reads as follows:

60 (a) Laboratory. Study of the spike of wheat.

Materials. Heads of two or more varieties of wheat. The following are suggested: Dawson's Golden Chaff, a soft white winter; Fultz, a red winter; Turkey, a hard winter; Fife, or blue stem, a hard spring; Durum, a macaroni. The spikes of wheat should be laid between pieces of moistened blotting paper for several hours before handing to students, in order to toughen the parts.

Request each student to report the following, after examining a head of wheat:

1. Number of spikelets in the spike of wheat.
2. Number of flowers in each spikelet.
3. Number of grains in the whole spike.
4. Determine the number and arrange weight of grains occupying first, second, third and fourth place from rachis.
5. Number of empty glumes in a spikelet.
6. Make a sketch of the beak, shoulder, and auricle of the empty glume.
7. How does the flowering glume differ from the palea?
8. How is the spikelet attached to the rachis?
9. Draw the rachis.

(Cereals in America, pp. 31-33.)

The laboratory exercise is followed by a recitation in which it is sought to develop the purpose of this exercise.

Lastly an illustration of a demonstration lecture is given.

51 (2) Demonstration. Germination test of corn. Materials. Ten or more ears of corn.

Perform the test by the method given in Farmers' Bulletin 243, page 8. In this manner test seed for farmers in the community.

This is followed by a recitation on the germination of seed corn in preparation for which students are required to study Farmers' Bulletins 229 and 253.

It will be noted that in each of these cases the recitation does not precede but follows the exercises in which the student is taught to observe and reason for himself.

I once had a class in what is known as Animal Mechanics. Instead of assigning a lesson in a text-book, without any previous preparation I took the class into a room where there were some horses and two pairs of scales placed side by side in such manner that the front and hind members of the horse could be weighed separately but simultaneously. The students were requested to determine these weights and calculate the position of the line of gravitation. Then they placed the front feet of a horse on a box so as to represent the horse going up hill or the hind feet on a box to represent him going down hill, and determine whether the line of gravitation had changed. After one of these students had been working for an hour or so, he came to me and said: "I must have made a mistake, I do not find that the line of gravitation has been changed." "Well," I said, "if you found it to be so, it must be so." With that easy, confidential air that a student will often assume toward his instructor in field excursions or laboratory exercises, the student said: "Professor, are you trying to string us?" "No," I laughingly replied, "I am not trying to string you. I am trying to get you to determine the facts. To-morrow I will explain to you the reasons for the facts." A half hour later the same student came to me with a correct explanation of the facts which he had thought out for himself. I could have given the facts and explained the reasons for them to the whole class in fifteen minutes. But the information would have been my information. In two hours the student had determined for himself the facts and thought the reasons. The information was no longer mine; it was his.

But, you may say, as others has said, that no teacher short of an agricultural college graduate is prepared to teach this syllabus, and that there are not enough agricultural college graduates to man the high schools of the country even if they had the inclination and were otherwise qualified for teaching high school students.

It is not quite true that no teacher could teach this syllabus. A teacher with a good fundamental training in chemistry and botany could take this syllabus and successfully present the subject to high school students. But if we are looking at it from the standpoint of State system of public instruction for all practical purposes, it is true. It is probably true that the Agricultural College in this State will not in the next ten years graduate enough men and women to supply the needs for agricultural instruction should it be placed in only the township high schools of this State. This is on the assumption that such college graduates would be qualified to teach, and if qualified, would be willing to accept the positions offered. One phase of this question may be illustrated by calling attention to some statistics concerning agricultural college graduates.

The institution with which I have been connected for four years has in that four years given 122 degrees to students in agriculture. There have been given 85 first or baccalaureate degrees, 32 second or master's degrees, and 5 doctor's degrees. It will be recalled that these statistics include the class which graduated on June 20, and that the oldest graduate is of but three years' standing. The average compensation received by 30 of those having first degrees and whose salaries are known, has been, during the past year, or will be during the coming year in case of recent graduates, $1,039, and for 25 having advanced degrees, $1,612, or the average compensation for 55 whose salaries are known is $1,300. This is in most instances their initial salary. A short time ago I compiled the initial salary of 21 persons who had been students of mine and the average was $1,030.

Is there no way of getting agriculture taught in high schools? There is, I think, a perfectly feasible and simple way to reach this question. As is well known to the members of this audience, it is a common practice in summer schools for students to receive the same instruction and to get the same credit in German, Latin, French and other subjects in six weeks as they receive by pursuing the subject through the academic year in a University. In a University the students may pursue six three-hour subjects for 36 weeks, or he or she may pursue one of these subjects during six weeks in the summer school. Now if it is possible to prepare a teacher to teach German or French or Latin or physics in the high school by six weeks of continuous instruction in a summer school, it is possible to prepare a teacher to teach this syllabus on agronomy at a summer school especially organized for this purpose. A teacher cannot be taught all there is to be known about agriculture in six weeks any more than he can be taught all of physics or German, but he can be prepared to teach this syllabus.

Through the direction of your State Superintendent of Public Instruction, Dr. N. C. Schaeffer, this plan is to be given a trial in this State this summer. There are under the supervision of the State Superintendent of Public Instruction three summer schools located at Pocono, Mt. Gretna and Ebensburg. Arrangements have been made for professors from the School of Agriculture of The Pennsylvania State College to teach teachers to teach this syllabus on Agronomy. The Columbia County Summer School, under the direction of Superintendent Evans, also wished to have similar instruction given if a suitable teacher can be obtained.

This plan is fundamentally different from the one that proposes to make agricultural college graduates principals of high schools.

It is not the purpose to train agriculturists to become teachers, but to train teachers to teach different branches of agriculture. There are a number of things to be said in favor of this plan. In the first place, it will work. It is perfectly feasible to assemble any number of already well-trained teachers and give them the necessary subject matter or put them in the way of getting it in six weeks. To show them the method of teaching this syllabus by actually performing every demonstration lecture, every laboratory exercise and taking many field excursions which these teachers would repeat during the year in the high school. A set of laboratory apparatus and the materials necessary for the successful presentation of this subject could be prepared at this summer school and each teacher supplied with an outfit. This is an entirely different matter from teaching boys and girls who have studied agriculture or Latin or physics to teach one or more of these subjects successfully.

In the second place, this plan does not contemplate any change in our present agencies for education which in any State system of education must be considered. All the various universities, colleges and high schools will continue to educate the youth of the State. Normal schools and summer schools of the usual sort will continue to train teachers to teach. The sectarian colleges will lose none of their influence by this new education, since they will continue to educate the young men and young women as far as their facilities will allow.

In the third place, this plan of instruction is so simple that no new agencies are needed, and so far as I know, no new laws need be enacted. The only thing that is necessary is that there should be a real, sincere, demand by the people for this education.

There were in 1900 about 225,000 farmers in Pennsylvania. If we assume that the business life of each farmer does not exceed, on the average, over a third of a century (the average is really probably much less), then it follows that 7,000 persons begin farming each year, who never farmed independently before. Do the members of the State Board of Agriculture believe that the State possesses any responsibility for this body of men (who annually begin to create wealth from the soil) while they are between the age of 14 and the age of citizenship, the most important period in the development of every boy. Do you believe that the prosperity of this Commonwealth would be enhanced by teaching them during this formation period something of that large body of knowledge relating to their calling that is now available? If you do, you possess both a duty and a privilege. It is to create a demand in communities where now no demand exists and to make effective that demand where or when it does exist.

The CHAIRMAN: What shall be done with this address of Dr. Hunt?

MR. HUTCHISON: I move it be received and published with the rest of the proceedings.

This motion being properly seconded, it was so ordered.

The CHAIRMAN: When the report of the Entomologists was called for, Prof. Menges promised to report some time later. I presume we can now call on him to do so?

## ENTOMOLOGIST'S REPORT, NO. 2.

By Prof. Franklin Menges, *York Pa.*

Mr. Chairman, I have only an informal report to make, one, I should say, that is mainly suggestive. In connection with a few others, I have tried to find something that would be of value to the members of the Board in their efforts to destroy the San José Scale. My own idea is that the farmer is entitled to something that will destroy it as cheaply as possible, and as thoroughly, at the same time.

We do know that there is a great deal of difficulty in the preparation of the lime and sulphur mixture. I am not going to talk against it; I use it myself; but I find that there are a great many people who have a great deal of trouble in its preparation, and they are sincere in their doubts as to its efficacy. For instance, one man told me that while he knew the color of the lime and sulphur wash, when properly made, should be a dark brick brown, when he prepared it, it came green. I asked him what lime he used, and he said he used Magnesium Lime. That explained it. It was just as efficacious in destroying the scale as though made of calcium lime, but the color gave the man some trouble.

A number of experiment stations have made formulas for soluble oils, and have issued bulletins for their preparation, but I doubt if they are any more simple in their preparation than the lime and sulphur mixture. Now, take this, for instance: Carbolic Acid, 2 quarts; Fish Oil, 2½ quarts; Caustic Soda, 1 pound. Heat to 300 degrees Fahrenheit, and after the mixture is taken away from the fire, add 3½ quarts of Crude Petroleum and 5 quarts of water. This substance we call the Emulsifier, the part of the mixture that will give it uniformity. The other part of that mixture is made thus: 1 part water, 8 parts Emulsifier, 16 parts Crude Petroleum, 4 parts Rosin Oil. Mix thoroughly together, and you have a twenty-quart soluble oil.

Now, I would like to know whether that is easier to make than the lime and sulphur wash? It is certainly more difficult. Therefore, the soluble oils do not help matters very much. You know very well that the average farmer would not go to all that trouble and expense. So, in order to see whether there might not be some other remedy for the San José Scale, besides these soluble oils so difficult to prepare, and the lime and sulphur mixture, not much less so, we tried the following: 3 pounds of light soap (any soap that would float in water; I would not recommend any particular soap), 10 gallons water; heat the substance in the air, and make a solution; then add 15 gallons coal oil.

After that mixture is thoroughly emulsified, you can make out of that twenty gallons, one hundred gallons of spray, and apply it. I am glad to say that with us it had the desired effect. It killed the San José Scale.

Then we did a little more work along this line. You know the lime and sulphur mixture is credited with having fungus effects also, and in order to determine whether this same principle could not be applied, we made a mixture something similar to the one we had already made; we took 15 gallons coal oil, and with it we mixed 8 ounces Carbolic Acid.

This we dissolved with one pound, or you can say, two or three pounds, as you like, but I prefer two pounds of the soap that we have already talked about, and sprayed it, and it had the desired effect.

The SECRETARY: What do you mean by coal oil—crude petroleum, or kerosene?

PROF. MENGES: Kerosene. Mr. Chairman, I am not ready to say that this thing will work all along the line, but it has done the work for us. You see the great simplification in the preparation, and that, I think, is one of the chief considerations in the spraying business. Now, I am not here to criticise. That is not my object. My idea is to try to see whether we cannot simplify and reduce prices, and at the same time have just as effective an agency for the destruction of the San José Scale.

Now, there is another subject that I have done a little work on—just happened to—and that is the Peach Tree Borer. You know when a fellow has to get down on his knees to dig out this borer, he don't like it at all—

The SECRETARY: Neither does the borer.

PROF. MENGES: So I decided to see whether I could not find some means or other of destroying that fellow without getting down on my knees. I dug a little around the tree, and took my spray pump, and filled it with boiling hot water, and sprayed the trees around the roots with the hot water, and I am glad to say I had no borers around my trees. Usually one application of hot water will answer the purpose, so far as I know. Now, it is a great deal easier than digging out those fellows. If you have allowed the borers to stay there year after year, I don't say that the hot water will do the work. I had them taken out every year, except the last three years, when I applied the hot water.

The SECRETARY: How do you manage to keep the water hot?

PROF. MENGES: I don't keep it any hotter than it stays in the pump until it is empty.

MR. SCHWARZ: What is the earliest time that he deposits the egg?

PROF. MENGES: So far as I know, the egg is laid in June, and hatched out in July, but if you apply the hot water, he will not hatch out.

MR. STOUT: I would like to ask the Professor what would be the price of his emulsion.

PROF. MENGES: Our coal oil costs us 9 cents a gallon, and the soap we used cost us 4 cents a pound; we used three pounds—say about $1.47 for the mixture—1½ cents a gallon.

MR. SCHWARZ: How do you make that out?

PROF. MENGES: I make a hundred gallon solution.

MR. HALL: Do you use the spray nozzle, or the direct stream for the borer?

PROF. MENGES: The direct stream; I took off the part of the nozzle that makes the spray, and just used the stream.

MR. FENSTERMAKER: How much do you apply to a tree?

PROF. MENGES: From half a gallon to a gallon.

MR. SNAVELY: How often must the hot water be applied?

PROF. MENGES: I said twice, but if you are thoroughly acquainted with your tree, and know it is in good condition, I think one application would be enough in July, August or September.

MR. SCHWARZ: Does that kerosene dissolve in water?

PROF. MENGES: Yes; it emulsifies with the soap in the soft water down in York; I don't know how it would do in hard water.

MR. HALL: How much does the carbolic acid add to the cost of the spray?

PROF. MENGES: The carbolic acid we can get for 32 cents a gallon; the spray costs about 1½ cents a gallon—possibly a little over, but something like that. Now, I don't know whether you people can get coal oil quite as cheap. We have a little bit of competition down in York.

MR. COWAN: We produce it in our country, and we can't get it quite as cheap.

MR. McGOWAN: Do you leave the ground exposed all winter, or do you put it back again after applying hot water to your trees.

PROF. MENGES: We don't dig down very deep, and then we leave it so.

MR. GOODERHAM: Do you recommend putting coal ashes around the tree?

PROF. MENGES: That is all right.

MR. SCHWARZ: For what purpose?

PROF. MENGES: If you have wood ashes, they will prevent the borer from damaging the tree.

MR. GOODERHAM: How about coal ashes?

PROF. MENGES: They are not so good as wood ashes.

MR. SNAVELY: Did I understand you to say wood ashes?

PROF. MENGES: Yes, sir.

MR. SNAVELY: I used unleached wood ashes, and they took away the bark of the tree, but it had some effect on the nits of the borer.

PROF. MENGES: Last summer I put it on radishes for the maggot, and wherever I did not apply it, I found the radishes infested with maggots; where I did apply it, it killed the maggots.

MR. SCHWARZ: Did I understand Mr. Snavely to say he killed his tree?

MR. SNAVELY: No; wood ashes did that for me.

MR. WEIDNER: Will the hot water also kill the tree?

PROF. MENGES: It did not do so for me.

MR. BLYHOLDER: I desire to offer a resolution, and my object in offering this resolution: We met here last year at the same time several other societies met, and I think that inasmuch as the Legislature will be in session again, next year, it would be a good thing if we could all meet together again. With this end in view, I beg to offer the following resolution:

"Resolved: that it is the wish of the State Board of Agriculture (if the same can be arranged satisfactorily) that all organizations represented in the allied agricultural organizations of the State shall meet in Harrisburg in January, 1909, as nearly upon the same date as can be agreed upon, and that a committee of three be appointed to effect said arrangement, and that the Secretary be one of said committee."

MR. FENSTERMAKER: The Horticultural Association, at its meeting at Lancaster decided to meet here next year, and I have no doubt it can easily be arranged as to dates.

The CHAIRMAN: Any other remarks?

MR. HERR: The Secretary said "Why not make it the fourth week in January?" Fix our time to meet, and then ask them to meet with us.

MR. SCHWARZ: That is the only satisfactory understanding.

MR. BLYHOLDER: Why not let the Committee fix the time of meeting? For that reason I included the Secretary in the committee. They will be better able to work out the details than we can do now.

The CHAIRMAN: I talked with a number of the members yesterday, and I find that the sentiment is largely in favor of holding a joint meeting of the agricultural organizations here next year, so as to bring to the sense of the Legislature the power of agriculture.

DR. HUNT: I have no right to vote, and I simply want to ask whether it would not be possible to arrange for an allied executive committee of the several associations?

The CHAIRMAN: That is the purpose of this resolution; it was simply offered so that a committee from this organization would be authorized to confer with committees from the several other organizations. Is the motion to adopt that resolution seconded?

A Member: I second it.

The Chair having put the question, it was decided that this committee be appointed.

MR. BLYHOLDER: The Chairman has asked me "Will you be chairman of that committee?" but I would prefer that he appoint this committee from members of the Board right here in the city, so that they may be able to confer at any time.

The CHAIRMAN: I will appoint as members of this committee, our Secretary, Mr. Critchfield, Mr. Hutchison and Dr. N. C. Schaeffer, Superintendent of Public Instruction, and a member ex-officio of the Board. These gentlemen are all here at Harrisburg, and can meet at any time for the purpose of conference.

We will now proceed with the next number on the program, an address by Mr. Bradfute on "Starting in the Pure Blood Livestock Business."

## STARTING IN THE PURE BLOOD LIVESTOCK BUSINESS.

BY S. E. BRADFUTE, *Xenia, Ohio.*

The average family in these United States is composed of 4.6 persons. This average family, we are informed by statistics gathered at Washington, consumes in one year: 431 pounds of beef, to which is added 49 pounds of veal, making 480 pounds of beef product; 39 pounds of mutton, 30 pounds of lamb, making 69 pounds of mutton products, and 465 pounds of pork, making a total number of pounds of meat consumed in a year by an average family of 1,014 pounds.

When we consider the immense amount of money that is invested in the livestock business in this great country of ours, I need make no apology for coming to you this afternoon to discuss for the second time some of the features connected with the livestock industry in this country of ours, and particularly for coming before you to discuss this afternoon a subject that lies very close to my heart, that of engaging in the pure blood livestock business. This subject was mostly prepared for the purpose of talking to younger men, who are about to engage in the livestock industry, and in the pure blood business, but I certainly am not averse to talking to the fathers of these young men, knowing that in many cases it will be very much through their fathers and brothers that these same young men will engage in this livestock business.

A young man often wonders, in settling on the farm, whether or not he can gain any special recognition by living on the farm. Young men often feel, and I have noticed that particularly in young men who go to colleges, and used to feel a great more than they do now, that when a young man goes back to the farm from his college studies, he is simply going back to hard work, and nothing else. Now, that is not true. I want to say this to the fathers of the young men who are here, that the young man can gain as much—shall I say notoriety? No; that is hardly the word; but a young man can gain as great a reputation on the farm, engaged in the livestock business, and will stand a better chance, I believe, to gain that reputation, than in almost any other business into which he may go. I know that the livestock business in Pennsylvania has hardly reached this importance yet, but I am not afraid to stand here and say that many of you gentlemen who are here can name more prominent livestock men in the State of Pennsylvania than you can name Congressmen. I believe that the average livestock man is better known throughout the length and breadth of his county than is the average Congressman. I know that every boy believes that he would like to be a Congressman, but I do not see why he would not just as soon go into the livestock business, and gain his reputation by means of the livestock business than he would by going into Congress, or in any other way. I have often wondered that the people of Pennsylvania have allowed the prominence they once had in that direction to go down. It is, gentlemen, one of the things that I cannot understand, why such a county as Washington, in Pennsylvania, that once stood in the very forefront of the livestock business of these United States, no longer holds this reputation, as it once did. I have often wondered what has become of the Berry's and the McNary's, and others who were once engaged in the livestock business in Washington County, Pennsylvania. You have allowed other counties to outstrip you in this particular. It is not because the same material is not there; the same material is there to-day that has always been there; and you have other counties that are better qualified than Washington for this business. Some of the Southeastern counties of your State are better qualified for this purpose than was Washington, but you have allowed other nearby states to outstrip you in this industry. Particularly is this true since the Varguns of old Virginia and West Virginia went into this livestock business.

Now, I would not advocate any young man going into the pure blood livestock business who has not a love for the business. He must be a lover of pure bred livestock, or I do not believe he will succeed very well; and not only that, he must select the kind of livestock that most closely appeals to his taste, in order to succeed. Now, if a young man has decided to go into the livestock business, I would recommend him to go into the pure bred livestock business. I believe that the Eastern people are particularly the people from whom emanated the pure blood livestock. You have heard of the importance of good seed corn, and it is the same in the livestock business. You get the best results from the best seed, and the pure blood livestock is furnishing the seed for the livestock business. We have told you the enormous amount of meat consumed in this country, and every time a man eats a piece of meat, he wonders why it is not better. The only way it can be made better is by the use of pure blood livestock. Yet the farmers are going on in the same old way. ignoring what it seems to me, is one of the best and most important means of success.

Now, if the young man is going to start in the pure blood business, what is the first thing for him to do? I should say the first thing he ought to do is to go to the city, and look around him, to find out what other people are doing, and what they want. I should want to send that boy to college, first of all. If I were in Pennsylvania, I should want to send him to the Pennsylvania State College, where he would learn something in that line, where they would teach him what the very best kind of animals are, and what are the very best of their kind. He would get an opportunity to see what are the best. Then I would encourage him to go away to the best fairs, at which he will see the very best kind of animals exhibited. and the best of their kind. There is no place as good for that purpose as a large State Fair. I don't know why you people here in Pennsylvania do not have a high-class State Fair. You have a few good county fairs, but my knowledge is that the very best livestock is not taken to these county fairs. It needs a high-class State Fair to induce the breeders of fine livestock to exhibit them. At a high-class State Fair you not only see the best your own State has to offer, but the best that the country has to offer, and often the best that foreign breeders have to offer. It prevents a man from settling down into his own locality, and getting into his head that his own particular kind of stock is the very best, better than any other can be. I don't know anything better to overcome this than to have that man take his stock to some place where it will come into competition with first-class stock from other localities; that man will go home with new ideas in his head, and start in making his system better.

So the first thing I would advocate in starting in the pure blood business is to see what is the standard, and what the conditions of pure bred stock. Then, when you have decided on the particular kind of livestock breeding in which you want to engage, whether cattle, sheep, or hogs, then find out the particular breed that appeals to your taste. I am not here to advocate any particular breed; let the young man find what will suit him, and then study his locality. He must have his market in view, how he will dispose of his animals to the best advantage. The market to which he must send these animals must largely determine the breed of livestock in which he wants to engage. The two must work together. the particular breed of the stock, and the character of the market.

After you have decided on what you are going to have, select a high ideal to work up to. I like to think of the livestock man as a sculptor; he takes the plain material, and out of it he works his ideal; he knows before he starts what he is trying to do. It is hardly possible for him to fully reach that ideal; he always sets it a little higher than he can reach, but the ideal is there all the time. An ideal that is easily reached is too low to be of much value. So, when a man is going into the livestock business, he must have his ideal, and he must purchase his animals with reference to that ideal, and I would say to the young man going into the livestock business, "don't expect too much of the animal at once." Don't undertake it largely until you know what you are doing. Don't undertake to invest thousands of dollars until you know you are right. Don't undertake to buy the fabulously high-priced animals until you know they are the right thing for you to have. There are men who can buy animals worth from a thousand to five thousand dollars or more, but it is not, in my opinion, good business for the beginner. He must be sure that he can make the business go, before it warrants such an expenditure.

Now, in my opinion, the first thing is to get good, high-class grades of good, pure blood sires. I believe any man should use pure-bred sires if he wants to produce the best results. It is only by fixing a high standard, and long breeding along certain lines that we can obtain the best results. It is when the animal becomes a steer, and has shown certain tendencies, towards which we have been breeding a long time, that we can depend on it. When you have the sires that approach your ideal that you can depend on them to produce that line, and when you have a sire that is not pure breed, you can not depend on him producing progeny that is more than three-fourths like him. The grade progeny may look like some of his ancestors than like him, therefore I would use a pure bred sire in my herd until I could find out what I could expect to accomplish, and then you can begin to invest in something a little more costly, but do not make the mistake of getting anything but the best. The men who have made the greatest success in the livestock business are not the men who have started in with their hundreds of thousands of dollars. They have gone into it slowly, with the expectation of building up success. You cannot expect to reach success in one year, or two, or expect it, indeed, without heavy work, or even in one generation, but often only in two or three generations. If I have made any success in livestock growing, I attribute it largely to the fact that my grandfather started in the business, and my father continued it. I am simply making use of some of the things they found out. I am glad to see that the agricultural colleges of to-day are giving their students the benefit of such study as the ordinary man could not get. We find in the classroom the instructor bringing together all the valuable information that has been gathered by successful breeders all over the country, and they can teach the young man so that he can start in where the older livestock man left off. It is a wonderful thing to think of, that the young man, starting to-day, has the experience of generations to guide him. You older men who are in the business had to find things out only by your own experience, by hard knocks. But the young man of to-day has not only your experience, to profit by, but the experience of hundreds of other breeders, which has been gathered together and put in books that he may have it.

Now, I said something about studying the markets. We must also study the locality; what is it; will it back you up; will it be friendly to you, or not? There are always two kinds of neighbors in each neighborhood, the friendly and the unfriendly kind. There is the neighborhood in which nearly everybody has some kind of livestock, which will, necessarily bring men from a distance. I know several years ago a man near us started in the same business as mine, and some of the neighbors said "that man is going to be a rival to you and take away some of your business." That man was wealthy, and could succeed in business, and I knew it, but I said " my friends, he will not harm me, he will help me." "Why," they said, "how can that be; he is in the same line; he has finer farm lands, and more of them, and he will take away your trade." I said "time will tell." Time did tell; what did it tell? When people from a distance began to think of livestock, they consulted the list of breeders, they said "now, here are two large breeders of horses close together. This is the place to go." And they came to us, hundreds of these buyers. Now, do you see the point? Now, it happens that there are not only two, or four, or six, or eight breeders right in that section; now, when a man who wants to buy comes to that section, he thinks "here I can have the benefit of competition and selection." So they came in large numbers, and instead of hurting us they help us. Why, some of you remember when Washington County was a great breeding county, how people went there, not because Benjamin McNary was there, not because there was a whole community of breeders there. If you could take the Southwestern section of the State you could find breeders from the Virginias there because they know they would find a variety of stock there.

Now, there is another locality that seems to me desirable, and that is the locality where almost all kinds of livestock are grown. I do not know whether it would be of any use to tell you of a little section in Southwestern Ohio where you can find a town with a certain five-mile radius, ten miles diameter, but in that little spot can be found more pure blood livestock, and more kinds than can be found in any like spot anywhere. Almost every breed of livestock that you can think of can be found in that community. A few years ago, of the various Boards of Officers of the National Recording Association of livestock such as Shorthorns and Angus, and sheep, there were one hundred and forty-six located right in this little spot. And when any International Exhibition opens at Chicago, there is at least one, and sometimes three, of the judges selected from this little territory. At St. Louis there were five herds and flocks went from this territory. They won the prizes, and 150 did twice, and 147 were premier or champions of the show, and yet they all came from this little territory. I have known as many as nineteen carloads shipped from this little point to the Ohio State Fair, and almost every exhibit of the first class.

Now, I think you can see the value of such a locality if you engage in the livestock business; each man engages in a friendly rivalry to have the best of the class he breeds and by having the different kinds to select from, they draw a high-class of buyers to that community. For instance, say here in Pennsylvania, and out West there are two men who want to buy Oxford rams and Shorthorn bulls, or some Chester White or Duroc hogs. Now, they will get on the train and go where they can buy all these things. Now, they have the advantage of each other's counsel and advice when they want to buy, so they go together to a community like the one I have just mentioned. Now, nearly every one of the men I have just spoken of are young men; very few of them have reached the age of fifty years, and yet if I were to name some of these men you would know them as men of national reputation—better known than the average Congressman of the United States, or even of Pennsylvania. So I want you to see what can be accomplished in the livestock business.

But, you say, we have not got this market; you never will have it unless somebody begins, but I do not know of anything that will make a man feel within himself that he is of some importance than having first-class livestock to offer. You know how proud a man feels when he wins a prize with his stock. When a man achieves success in other walks of life, there are many things that may contribute thereto, but when it comes to the livestock business, it is the work of the man himself that insures success. In the livestock business you have so many exceptions to contend with. There are so many variations. He has to be constantly with his stock, and studying it, and striving to bring it up to a high state of perfection. He is constantly thinking, and he has to be man of education because he is constantly thinking.

Now, there is another thing that seems to me to be of special importance to the man who starts in the pure blood business. He must not only be a man of education and culture so that he can talk and think intelligently, but he must keep his home and his surroundings in good condition. When men come four or five hundred miles to see him, he begins to think he is of some importance, and he cannot afford to have them come to a tumble-down place. He must fix up; he must make his home more pleasant, because he must entertain strangers over night. Then his neighbors begin to think that Smith is getting to be of some importance, and they begin to help him a little. If there is one thing that I am proud of in that little community that I have been telling you of, it is that there is no little petty rivalry or jealousy there. Everybody feels that they have got to help the other fellow, and if a man comes there with a hundred dollars, he won't get away until he has spent that money. If the cattle breeder can't sell him cattle, he may turn him over to the sheep man, and if he can't be interested in sheep, he will probably be induced to buy chickens before he gets home. For this reason I feel that the man who would engage in the pure blood livestock business should be a man of high culture, and business ability. He must not only work for his own interest, although that always comes first with us all, but he must help the community in which he lives. If he cannot sell a man, he should at least endeavor to keep the money in the community; you know what a stimulus it is to a community to feel that every man in it is trying to build it up in character and finance. You fathers know what it means to your sons to live in a community where every man is doing something for himself first, and for the community at large as well. That is the kind of man we want to grow in this country. We want to improve the livestock of the community and at the same time we want to improve the community. I know of nothing that improves a community more than high-class livestock, because it means a high-class man behind that livestock.

Now, I propose to say a few words in regard to that starting out in this business. One of the first things you want to know is how to attract buyers. I think I have indicated a little as I went along some of the ways in which you can attract buyers. The very first thing is, that you must have your stock in such condition that it will attract buyers. You must know that there is nothing more disappointing than to travel three, four, or five hundred miles to see a man's stock, and then find that stock is not what was promised you it would be. Instead of being attracted, the buyer is driven away. He has lost his trust in you because you have misled him in that way. There comes the importance of being a good judge of good livestock. You can describe your stock in every possible way as first-class stock, but when the buyer comes there he will soon see you have misled him, if it is not what you represented it to be. There is nothing like seeing, to convince a man, and these buyers are, nearly all of them, good judges. And after you have once misled a man he will never trust you again. It is far better to make the animal a little worse than it is, rather than better than it is. Therefore your first motive should be that your animal should be of the stamp you represent it to be. You will get many cases of mail orders, because the men have not time to come. This is a mistake, in my judgment. No man should buy blooded stock as he would buy a pig in a poke; he should see the stock, and become familiar with the type of the stock, and with its character. Many men make the mistake of thinking that simply because an animal is pure bred he is all right. It is a very common thing for me to get letters something like this: "Please quote me price on calves three or four months old, or on bulls three or four months old. Quote them as cheap as you can make them, because I have written to several other breeders, and the one that makes me the best offer will sell me the calf." Now, I have learned that it will not be well to sell that man. He simply does not want to pay for a good animal; he wants the commonest, most ordinary, little calf you have, if you will let him have it cheap. His letter indicates that he does not care for breeding; that it does not matter how the animal was bred, or where. Now, that is not so at all. It is like buying a suit of clothes from a clothing house. If a man were to write a clothing house simply to send him a suit, without stating what kind he wants, or what size, or how much he is willing to pay for it, they would probably write him that they could supply him with a suit all the way from ten dollars up to fifty dollars or more, but they must have some more definite information. That way you would probably get your money's worth, and it is just the same in the livestock business. A man should know just what he wants, and how much he is able to pay for it. I frequently write to such a man and give him a range of prices, and then ask him to tell me what he wants, and how much he is willing to pay for it, and I am often able to lose a buyer of that kind in this way.

Then there is another thing that is of great importance to the man who wishes to attract buyers, and that is to take sample animals from his herd and exhibit them at the county or State fairs. There he can reach from twenty to fifty thousand people in one day—more than he would be able to interest in any other way in a year. It is one of the best advantages the livestock breeder can have. People will soon see whether his stock is worth anything or not. Here it is brought into competition with the same kind of stock from all over the country, and a man will soon see that he has by no means the best that can be bred along certain lines. If he has any sense, he will take advantage of what he learns, and set about further improving his stock. But at these fairs you will often find men who come prepared to buy the leaders, and here is the breeder's opportunity for establishing a reputation. Perhaps that man comes from a neighborhood into which you have never sold anything, and you are sending that sample into that neighborhood for criticism. If what the breeder has said about that animal is true, he will have gained an opening there, but if you have misrepresented anything about that animal, it will come back very quickly, and will frighten away other buyers, instead of attracting them. In the livestock business it pays to tell the truth, the whole truth, and nothing but the truth. The market you create for your animals depends upon what you promise for those animals. If the animal you sell into a new community comes up to its reputation, then your market is established; if you have misrepresented it, the animal will come back, but the buyer will not, nor any other buyer from that community. Of course, you cannot guarantee how many years an animal will live, or how many progeny it will have, or anything of that kind. But you can guarantee that it is perfectly healthy at the time you sell it, and you can guarantee his conformity to the type from which you have bred him, and you can guarantee his pedigree. These things you can guarantee, and must guarantee if you are going to succeed in the livestock business.

Now, I think I have perhaps taken all the time I should on this subject, but I am somewhat interested in it. I have wished and hoped that there would be more young men interested in this particular line of work, in the breeding of pure blood livestock, because, as I have said before, and repeated time and again, I believe that there is nothing that will so enable a man to build up a character and reputation as will engaging in the work of breeding pure blood livestock. I thank you.

MR. HUTCHISON: The gentleman spoke of the decline of livestock breeding in the western part of the State, particularly in Washington County, and wondered why it should be so. The explanation is quite simple. Since it has been found that there is coal in these lands, the coal companies have been buying them up at high prices, and developing the mines. I know, for instance, one farmer, who had been a breeder, who sold his land to a coal company at $7,000 an acre, and he and his family are living on their money. Others are just sitting on their land, and holding it waiting for the coal buyer to come along. Our friend Mr. Barnhart who used to come here has just sold his farm for $250,000. This is what has taken the trade out of the western part of our State. Out in Indiana and Washington counties you used to see the finest livestock you could see anywhere, but you see very little of it now. It is the money in Pennsylvania that has taken the agricultural prosperity away from that part of the State. There is nothing finer in the world than to walk out and see the growing of the young Jersey calf, or of other fine cattle. I would rather see something that I raise myself, and take care of myself, than to have a whole houseful of Congressmen. If I were wealthy, I would buy a herd of fine cattle and bring it into our township, and try to raise the general standard there, but I am not wealthy, so I can't do it. I hope it will come when you will see up at State College the finest herd of Guernseys that can be found, and a man can go there and find what he wants to improve his stock; or go to Brother Young here for Brown Swiss. The trouble is, that we have always been so anxious to make money that we have forgotten to improve our agriculture. My people all went to Ohio and prospered. I was the only one that stayed here. I am naturally proud to see Ohio take such a high rank in the breeding of live stock, but I am not sorry I stayed in Pennsylvania, because I think we are going to make an effort, at least, to regain our old prestige as livestock breeders.

MR. HERR: It has always seemed to me that there is a lack of enthusiasm on the part of the livestock breeders of Pennsylvania. I was at the Columbus Fair several years ago, and from what I saw there, I feel pretty well convinced that the success of the breeders of Ohio is largely due to that fair. Then I have been to the Toronto Fair, and have seen what the Canadians are doing, and I think the same thing holds true there. We ought to have a State Fair in Pennsylvania, the same as they have it in these places, to arouse the enthusiasm of the breeders, and to bring them together. There is no reason why we cannot have it. We have the allied associations in Pennsylvania, and if they get together, with the influence of State College to back us up, we can have as good a State Fair in Pennsylvania as they have in any other state. I am a Pennsylvanian, and I am not ashamed of it. Our resources are unbounded, and it needs only a little energy to get us started right in the way of livestock breeding.

MR. GOODERHAM: The first thing is to get an appropriation from the Legislature for it.

MR. MARTIN: I would desire to apply with even greater emphasis, perhaps, than the gentleman from Ohio, the necessity of pure bred sires in the herds of Pennsylvania. We have in Pennsylvania about a million and a half cows; possibly at least half a million of them are of no distinctive line of breeding. Now, to raise the standard of the Pennsylvania dairy, and of its livestock, it will be necessary to improve the breeding of its cattle. To accomplish this it will be necessary to use with the cattle, with the sheep, and with the horses, pure bred sires. Pennsylvania does not any longer wish to be the second dairy state in this great Union, and if we do our part it will not be long before she will lead the galaxy of states in the dairy line, and in stock breeding.

MR. GOODERHAM: As Washington and Greene counties were referred to, I should like to make a few remarks at this time. In behalf of our Farmers' Association, it was my duty to go over this section, not in two or three or four houses, but right in among the farmers, from farm to farm, and I could not help but feel sorry for them. These people received a good price for their oil and coal lands, and now they are taking their boys and girls away from the farm, and agriculture is declining in that section, as the result of it.

MR. GLOVER: I was greatly disappointed that Dr. Pearson in his talk yesterday did not mention one disease that more than anything else, is preventing the farmers in our section from going more extensively in the livestock business. It has cost them more money than tuberculosis and glanders combined. I have reference to contagious abortion. I have had in my time two pure bred Jersey bulls, from one of which I raised two calves, and from the other one not a single calf. I am not the only one who has had trouble in this respect, and I think the State should look into this disease in the interests of the farmers.

The SECRETARY: I can say that this matter is being taken up by our State Livestock Sanitary Board. We have received a larger appropriation for the work, which will enable us to do more than we have been able to do up to this time.

MR. MARTIN: Just one word to what our Secretary has said. We have gone into this matter at our Institutes, and in one of Dr. Pearson's bulletins he treats this disease thoroughly. We had ten thousand of these bulletins printed, and have distributed them at our Farmers' Institutes, but there are still some left, which we shall be pleased to send to the farmers of Pennsylvania.

MR. CLARK: If I am not consuming the time of any other speaker, I would like to say a few words. I listened with pleasure to the gentleman from Ohio when he spoke of livestock breeding. I can look back a few years ago, when the county of Westmoreland was filled with fine horses, but they have all passed away. Why? Because the men who have bred these fine horses have left for the most part. Those who are left are old and unable to give the work the attention it needs. The boys have gone away, and it is not a desirable thing for a young man to start in the business unless he has some practical experience to fall back on. To be successful in the livestock business one must know something about it. I have watched these things thoroughly, not in my own county only, but in a general way, and the movement of to-day is towards the boys going away from the farm, and the old people no longer able to continue the business. Now, these are the conditions that confront us to-day, and that we must face. I, myself, spent quite a number of years growing hogs. We grew them on my father's farm when I was a boy, and I thought I could do it all right, but I felt like a boy when I commenced myself. I was in the primer class when it came to growing hogs. It was years and years before I learned to know my hogs; and the same thing applies to any other kind of stock; the boy sees it grown at home, but when he starts out for himself he finds it is not so easy; he has too much to learn, and it goes very slow, and he becomes discouraged, and goes into something else; the old folks are too old to continue the business, and it declines.

MR. HERR: I want to say one other thing about my visit to the Toronto Fair. In wandering around the Fair Grounds, I saw one place marked "Farmers' Institute Headquarters." Well, I walked up through the crowd to see what those Canadians were doing; through an acquaintance I had made, I was introduced to some of the people there, and I sat down and listened with surprise and profit to the instructions those Scotchmen were giving to those farmers. They brought their specialists right down to the people there, and the people listened. I suppose, perhaps, our new traveling schools of agriculture are along this line, but to me it was a wonderful thing to be able to sit and listen to such instruction at a State Fair. I believe that a large part of the success of these Canadian farmers is due to just such things as this. It showed me what a wonderful agency for education a State Fair is.

MR. WARNER: I have listened to all these speakers with interest. The first speaker told us how to interest the boy in farming, and keep him on the farm. And at the same time I can heartily agree with the speaker who shows us where the fault lies that our farmers are not more largely stock breeders. Now, in my life, I have noticed that where one man has grown wealthy, several men have failed in the business because they did not have the practical experience or possibly the business ability, or the right methods.

I have attended the meetings of the State Board of Agriculture for twenty years, and every time I come, I go home feeling better fitted for the work through the knowledge I got there. Now, I hope we will all think over the subjects brought out by the last few speakers, and see whether we cannot manage to keep our boys on the farm.

The CHAIRMAN: You have heard the very admirable address by Mr. Bradfute; what shall be done with it?

MR. HUTCHISON: I move it be received, and published with the minutes of the meeting.

The motion being properly seconded, and the question put, is was so ordered.

The CHAIRMAN: We have some time left yet, and I notice some friends in the room from whom we shall be pleased to hear. We should like to have a few words from Mr. Agee this afternoon.

MR. AGEE: I would be pleased to have them hear from me, if I had a message for them. The afternoon program has been full. It has been my privilege to meet with you gentlemen for the past ten years, and I have spoken at many meetings in your various counties, so I think now is the time you should excuse me.

We shall be glad to have you come to the Pennsylvania State College and see our 187 boys in the School of Agriculture; you will not believe then that all the boys are leaving the farm. Our boys tell us that they will send hundreds back to us in "Farmers' Week" next year, and as we send these young men out to apply the knowledge they have acquired, we will be getting our young men back to the farm. Their interest and enthusiasm have been aroused. We have young men up there to-day who come to me and say that they would not care to take the four years' course in college, because they want to get back to farm life, and to the work of the farm. They want only the practical instruction that is given them in the two years course. They see ahead of them the practical life in agriculture. It is a fine lot of young men you are sending to the college. It is a hard thing to believe what our friend Clark says, and yet I know it is partly true. But we begin to see the attractiveness of the new agriculture that we are teaching the young man to-day; he is awakening to the possibilities before him in practical agriculture.

I suppose you will wonder why I did not set down when I said I had nothing to say, but I have been in the Institute work so long, that I have learned to talk even when there is nothing to be said.

MR. WARNER: A few weeks ago we received a notice of this meeting to be held at State College, and I told my son I thought he had better go, but he thought at first that he did not care to. Then he found that some of the other boys were going, and he decided to go too, although he seemed to think that the old man could not get along without him (which is pretty near true). When he came back he says, "Papa, those fellows are hustlers up there. They tell you just what you want to know." He never spent a better week than the one at State College. He took notes of what he heard, and now in the evenings, he will take out his notes, and say, "Prof. So and So says so and so about horses"— or about something else. Now, there is no better education for farmers than to come to a meeting of the kind we have had here to-day. I have always been a farmer; many of you men here know my father, who is ninety-three years of age; he has been a farmer all his life, too. I once said at a Grange meeting that my father had made farmers out of all his sons, and they told me "your name should be Lafayette."

MR. HUTCHISON: There is a Committee still to report.

MR. HERR: We will report this evening.

The CHAIRMAN: We will have nothing more, but I trust you will be here in time this evening. We have quite a full program.

Unable to be present at the meeting of the State Board of Agriculture, Dr. Funk prepared the following report and submitted same to the Secretary:

## REPORT OF PENNSYLVANIA STATE POMOLOGIST.

BY DR. J. H. FUNK, *Boyertown, Pa.*

I have the honor to present the following report on the fruit conditions of Pennsylvania for the year 1907. Throughout the United States the year 1907 will be recorded as an unprofitable year, not only in one but in all the fruits, being the smallest in yield in many years.

### Apple.

The total yield of apples in the United States for the year 1907 was 23,990,000 barrels, divided as follows:

| | Barrels. | | Barrels. |
|---|---|---|---|
| Pennsylvania, | 3,000,000 | New Jersey, | 400,000 |
| New York, | 2,800,000 | Connecticut, | 400,000 |
| Maine, | 1,700,000 | Illinois, | 350,000 |
| Kentucky, | 1,500,000 | Maryland, | 300,000 |
| Tennessee, | 1,300,000 | Colorado, | 250,000 |
| Michigan, | 1,200,000 | Idaho, | 200,000 |
| California, | 1,000,000 | Arkansas, | 200,000 |
| Ohio, | 860,000 | Wisconsin, | 200,000 |
| New Hampshire, | 800,000 | Iowa, | 150,000 |
| Vermont, | 750,000 | Utah, | 150,000 |
| Virginia, | 700,000 | Delaware, | 150,000 |
| West Virginia, | 650,000 | Missouri, | 100,000 |
| Massachusetts, | 600,000 | Rhode Island, | 100,000 |
| Indiana, | 600,000 | Montana, | 50,000 |
| Oregon, | 550,000 | Nebraska, | 40,000 |
| Washington, | 475,000 | Kansas, | 25,000 |
| | | All other states, | 2,500,000 |
| | 18,375,000 | | |
| | | | 5,615,000 |

Or a total of 23,990,000 barrels for the year 1907.
38,280,000 barrels for the year 1906.
24,310,000 barrels for the year 1905.
45,360,000 barrels for the year 1904.
42,626,000 barrels for the year 1903.

A total of 174,566,000 barrels for the five years.

Pennsylvania has produced in these five years, 21,800,000 barrels or one-eighth of all the apples produced in the United States during these years. During the year 1903 she produced one-fifth.

It is only of recent years Pennsylvania has been recognized as an apple producing state, but in this time she has gained the position of second and it will not be long before she will stand at the head. More than three-fourths of 1907 large apple crop was produced east of the Allegheny Mountains, and a very large proportion east of the Susquehanna River. Why is this? Ask those living in the non-producing sections and they will place Providence in fault, severity of weather, late frosts, &c., yet we find the climatic conditions about the same, we must look for other reasons.

The true reasons are, during the past ten years, since the advent of the San José Scale, those people having orchards in the eastern part of the State, noting the rapid decay of their orchards through this pest became aware that if they did not give better attention to their orchards they would soon be dependent upon other states for their fruit. Consequently they pruned out the dead and otherwise useless wood, cultivated and fed the soil, and gave their trees thorough spraying, these combined gave them a new lease of life, they responded to this liberal treatment and are repaying their owners ten fold for their time and expenditures. They have also planted new orchards and these are receiving modern methods of culture, which will in the very near future render the horticultural branch of agriculture one of the best paying industries in the State.

During the winter I spent several weeks travelling through the western counties of the State, and have given particular attention to the fruit conditions. I find the past season the apple crop, with few exceptions was nearly a total failure. I have been through all the large and small towns and found very few apples for sale, and those a poor second, while oranges are offered in great quantities in all stores where fruits are sold. Is it not a lamentable condition in a section of the country so especially blessed by nature, to neglect one of the most healthful fruits God has given us, and which can be raised almost without an effort. And import the poor half ripe oranges as a substitute. I find even worse conditions with the farmers. I have visited many farm homes the past winter and the apple or any other kind of fruit seemed to be a luxury beyond the reach of its members. Is it any wonder that children pray for deliverance from such surroundings, and there is no provision being made for the future.

In twelve of the western counties, I did not see twelve young orchards that had been planted within the last ten years, and the old orchards are woefully neglected, literal brush heaps, so thick with limbs and water sprouts that the vitality of the tree is exhausted in supporting the life of the tree that there is none left to bring fruit worthy of the name. These same people assert that fruitraising does not pay, and yet they have a veritable bonanza within their possession and do not recognize the fact. They are in the best portion of the great apple belt of the United States, they have an altitude of from 1,000 to 1,500 feet above sea level. The soil is well adapted as shown by the trees that have grown under neglect and starvation.

The same conditions exist with other fruits, I never saw more thrifty cherry trees than I saw in Butler and adjoining counties. These same people tell me it is useless to plant peach as they will not last, and yet at W. Sunbury, Butler county, I saw large trees growing in sod, without pruning or other attention that the owners tell me have borne successive crops for 15 years. The same experience is had in Crawford county, between Franklin and Blackash. In this section I saw as thrifty apple, pear and peach trees, with bark clean and smooth as I saw in any portion of the State grown under the same condition. Here would be a good location to have an orchard of select varieties of fruits under competent management to demonstrate to the people the possibilities of fruit raising in Western Pa., where there are thousands of acres of sutable land that is now laying idle which could be converted into a great source of revenue.

## Pear.

The pear crop this season (with a few local exceptions), was considerable below the average in quantity and quality owing to negligent methods of culture, where orchards and isolated trees have been receiving proper attention for a number of years, the crop was all that could be desired. At the Paragon Fruit Farm the crop was abundant, but a part was under size where the trees were in sod and had not been fertilized for a few years and the fruit not sufficiently thinned. These are essentials that must be observed to obtain success, care must be observed to avoid too much Nitrogenous food.

The pear is being sadly neglected, few trees are being planted, for fear of the blight, which has destroyed many trees the past few years, and yet it is an easy fruit to raise and very profitable. Blight has not been serious in S. E. Pa. the last few years, except where kept under high cultivation, which causes too succulent a growth, rendering them very susceptible to the disease. The Bartlett pear should be more extensively planted as it is a pear of high quality, valuable for canning or for eating out of hand. The market demands this fruit at high prices, the past season choice Bartletts brought from $6.00 to $7.00 per barrel. The Seckel is another variety that should be more extensively planted. The season of the year at which it ripens, its beauty, high qualities and productiveness all recommend it.

## Peach.

This choice fruit gave a very light crop the past season, not only in Pa. but throughout the United States, owing it is claimed to climatic conditions being unfavorable. It is so much more pleasant to put the blame on nature, than to acknowledge ourselves in fault. But where orchards were suitably located, hardy varieties planted, pruned, fertilized, thinned and cultivated as they should have been, the crop was good, and above the average in size and flavor. Prices realized were very satisfactory.

No new varieties of any special merit have been introduced the past season, the number of trees set were rather under, than over the average.

### Plum.

The plum crop was very light, unfortunately this valuable fruit is being neglected, a few years back when the Japan varieties were introduced, large areas were planted, as they were recommended as curculio proof. Although they did not prove so, they were for a few years very profitable, but from over-production, or lack of vitality they soon ceased to be profitable. They are very susceptible to the Peach Yellows and other diseases, and as they have died off the other finer varieties have not been planted as extensively as in former years, and it is now very rare to see any large quantities of choice plums on the markets. The curculio is the worst enemy to the growth of the finer varieties of plums.

### Cherries.

This fruit was almost a failure, very few trees of any variety had a crop. The sour cherry does very well throughout the entire State. The finer sweet varieties are very difficult to raise, they fruit well enough, but the difficulty is in maintaining the tree, they are so difficult to get started that the majority of the farmers become discouraged. The bark splits open on the sun side. Young trees should have their trunks protected the first few years. The western farmers are even neglecting the sour varieties, giving them up to the black knot. If they would prune these off and burn, and spray their trees with the lime and sulphur solution while the trees are dormant they could raise abundance of this choice fruit.

### Small Fruits.

These were also below the average in quantity and quality. Taken as a whole, the past season was rather an unfavorable one, few farmers realizing any profits from their orchards. But the few who have given their orchards special attention have found the past season one of the most remunerative in many years. This again forceably impresses upon us the importance of giving the best attention, and never was the value of thorough spraying more plainly seen. This should be an incentive for better care in the future.

The following is Prof. Fries paper as per program:

## NITRIC ACID MANUFACTURED FROM ATMOSPHERIC NITROGEN.

By Prof. J. August Fries, *State College, Pa.*

The dream of converting the atmospheric nitrogen into nitric acid and eventually into saltpeter cheaply enough to be used on the farm as a fertilizer, has at last come true, and factories are now turning out large quantities of saltpeter. It shall be the aim of this paper to explain in part at least the methods employed for this purpose, but before going into detail of the latest and most promising process of manufacture of nitric acid ($HNO^3$) from atmospheric nitrogen, I shall briefly review, or make mention of some of the well established facts concerning the importance of the nitrogenous compounds, and some of the causes which have led up to the establishment of the industry referred to.

Importance of Nitrogen Compounds:—In our institutions of learning as well as in literature, great effort is made to prove to the students the importance of the nitrogenous compounds, and justly so. They are met with everywhere, and are daily handled by all of us in food, and clothing such as contain hair, wool, silk, or leather. Indeed the nitrogenous compounds hold the foremost place of all compounds met with in the plant and animal economy. Every living cell in all plants, for instance, contains more or less, but always some, nitrogen in the form of protieds and other compounds, together forming a mass going by the name "protoplasm" and without which there can be no cell activity or life. The tissues of animals however, are almost entirely composed of nitrogenous compounds, and in order for an animal to develop and grow, the food eaten must contain nitrogen in combined form, that is, in so called organic combination. Hence in the nutrition of man as well as of farm animals these nitrogenous substances form one of the three main classes of nutrients, and which are: Protieds (by many called albuminoids), Carbohydrates and Fats, laying special emphasis on, or attaching much importance to, the proteids. The proteids, which are the nitrogenous substances, are represented in a general way by the white of egg and meat.

We are also more or less familiar with the nitric acid and nitrates, and the importance of these substances in connection with agriculture and various industries. They are used in a multitude of industries in many ways and combinations, for widely different purposes, from the making of the destructive gunpowder and other explosives wherewith to tear to pieces the very mountains to the delicate art of photography, everywhere nitrogen compounds are used. But it is especially in the art of agriculture where enormous quantities of nitrates are used every year, and because of the necessity of using such vast masses yearly, the question, of how to obtain enough nitrogen for the soil in the future, has become such a vital problem.

Quantity of Nitrogen in Crops:—A few reliable figures may be quoted and lessons learned therefrom. In the country of France, for instance, the cultivated area has been calculated to be about 61,750,000 acres, and the crops grown on this area use yearly 600,000 tons of the element nitrogen, but that with the very best of economy not more that 330,000 tons of nitrogen will be returned to the soil in the various manures. We will not be very far wrong if we accept these figures as representative of any country, and if we apply them to our land where we are supposed to have at least five times as many acres under cultivation, five times the quantity mentioned, or 3,000,000 tons nitrogen would be used yearly by the crops of our soil. But since we are on the whole much more careless and wasteful with our manure nitrogen than most European countries, we can not count on half of the nitrogen being returned to the soil in the form of manure but considerably less.

Nitrogen Needed in the Soil:—According to Lierke's calculations (Praktisohe Düngertafeln, Berlin 1887), one acre of soil should contain, or have so much applied to it, that there should be available for the various kinds of crops the following amounts of nitrogen:

| | Small crop. Lbs. | Medium crop. Lbs. | Large crop. Lbs. |
|---|---|---|---|
| Cereals (grain crops), | 29 | 51 | 92 |
| Potatoes, | 52 | 86 | 120 |
| Fodder beets, | 48 | 115 | 187 |
| Turnips, | 48 | 109 | 174 |
| Carrots, | 60 | 119 | 166 |
| Meadow hay, | 28 | 83 | 165 |

With our present methods of farming and knowledge of agricultural science in general, we must, for some time at least, in order to obtain the highest possible results, figure on that at least half of the needed nitrogen will have to be applied in the form of bought fertilizers to most of our oldest or longest cultivated soils.

Sources of Nitrogen Available for Fertilizers:—The chief substances used are Chili saltpeter (nitrate of soda), sulphate of ammonia, bone and guano. Of these, sulphate of ammonia is a by-product in the lighting gas and coke manufacture. The guano beds are the accumulated droppings of birds, and are found on the coast and islands in certain localities in the southern oceans, but the supply of this fertilizer is now practically exhausted. Chili saltpeter is found in beds in the mountainous coast of Peru and Chili, South America. Here the crude salt is mined, purified and prepared for the market.

Enormous quantities of this Chili saltpeter has been exported during the last thirty years, as can be learned from the following figures, quoted from a publication issued 1906 by the Norwegian Nitrate Manufacturing Co. The ton referred to- 1,000 kiligrams or about 2,205 pounds.

| | Tons. | | Tons. |
|---|---|---|---|
| In 1860 the export was | 68,500 | In 1890 the export was | 1,025,000 |
| In 1870 the export was | 182,000 | In 1900 the export was | 1,453,000 |
| In 1880 the export was | 225,000 | In 1903 the export was | 1,606,000 |

The estimated worth of the last mentioned quantity was about seventy five million dollars.

DISTRIBUTION OF THE CHILI SALTPETER EXPORTED IN THE YEAR 1905.

| | Tons. | | Tons. |
|---|---|---|---|
| To Germany (direct), | 399,786 | To Sweden, | 22,896 |
| | | To South Africa, | 21,574 |
| To Great Britain (partly reshipped to Germany), | 386,584 | To Sandwich Islands, | 15,226 |
| To France, | 222,824 | To China and Japan, | 15,372 |
| To U. S. A., East coast, | 247,847 | To Danemark, | 12,090 |
| To U. S. A., West coast, | 34,500 | To Austria, | 7,590 |
| To Holland, | 97,842 | To Spain, | 6,070 |
| To Belgium, | 69,598 | To Switzerland, | 2,346 |
| To Italy , | 38,916 | To Norway, | 707 |

According to the computations of Prof. Dr. Otto N. Witt, Berlin, 1-5 of the Chili saltpeter is used for industrial purposes, and 4-5 of it in agriculture.

There is no nitrate rock formation, nor are there any natural stores of nitrogen compounds from which to draw, except these nitrate beds in South America, unless we include the newly found deposits of nitrates in California. These deposits are in the south east section, in San Bernardo county, extending across the line into Inyo county, and the beds mark the old shore-lines and beaches which indicate the boundary of Death Valley as it was during the Eocene times. Deposits are found containing from seven to sixty-one per cent. nitrate, and may be extensively enough to be of national interest.

Since the nitrate beds are in a sense only washed out manure heaps from sea birds, or animal remains, they are of necessity localized and of definite and limited size. New beds of nitrate are not being formed anywhere so as to be of any real value to the next coming generations, and it is therefore easy enough to see the inevitable result—the supply of nitrates must sooner or later became exhausted—and what then?

At the present rate of export of the Sodium Nitrate (Chili saltpeter F. W. Vergara (Chem. Ind. 1904 p. 29) has calculated that the nitrate beds will be exhausted by year 1923, only 16 more years, and should we even double the time it must surely take place during the present generation.

In view of this fact, that the largest source of fertilizer nitrogen supply is giving out, we can readily understand why the nitrogen question has become such a vital one for the scientific men everywhere, indeed, it has been so for a number of years.

The agriculturists and agricultural chemists have been asking: How shall the farmer get nitrogen enough for his crops in the future? Knowing that the air we breathe contains 79 per cent. nitrogen gas, it was very natural to look to this enormous, inexhaustible, supply and seek for means and methods whereby it could be made available to plants. Trials were made with plants to find out whether they themselves could make use of this nitrogen. Boussingault in the early fifties, 1851-1855, conducted experiments which indicated that plants could not assimilate the free nitrogen of the atmosphere, and the same conclusion was reached by Lawes, Gilbert and Pugh, through their elaborate experiments 1857-1858. But the investigations did not stop with these experiments, they were continued with different species of plants under varied conditions, and as a result, in the middle of the eighties, Hellriegel and Wilfarth could call attention to the fact that the legumes possessed the power to make use of atmospheric nitrogen and therefore to store up nitrogen in their tissues. This fact has since been investigated thoroughly by many scientists, and it is now known to be brought about by living organisms—bacteria—which are the cause of the root nodules of the legumes in which they live, grow and multiply, building up atmospheric nitrogen in themselves into organic compounds. These compounds later on are used by the legume plant which acts as the host for the tiny bacteria. This is the socalled Legume Nodule Theory. Besides the bacteria living together with legumes, the power of other bacteria in the soil to gather nitrogen is also a problem under investigation.

This nitrogen gathering phenomenon, which is observed in certain kinds of plants only, although it does not in any way cover the demand for nitrogen on the farm has been, and is, especially since it is fairly thoroughly understood, a great blessing to the agriculturist and agriculture. While this knowledge has helped the farmer and in thousands of instances been the direct cause of prosperity on the farm, it did not directly help the technical man any. Other scientists, however, besides those directly interested in agriculture have been at work on the nitrogen problem, and of late years several attempts have been made to manufacture nitric acid and other nitrogen compounds from the atmospheric nitrogen on a large scale by means of electricity, but the efforts were not crowned with real practical success until within these last three or four years.

That atmospheric nitrogen could be oxidized to nitric acid was mentioned by Henry Cavendish, as long ago as 1786, who had made the observation that nitrogen mixed with sufficient oxygen would be oxidized during large electrical discharges causing high rise in temperature. In 1781 he had also observed that, in burning hydrogen, nitric acid also was formed. Priestly also made similar observations, about that time, in regard to the formation of nitric acid by strong electrical discharges, but it was left for our present time to apply that knowledge and make it of real practical value. In 1892 Crookes made experiments in the line indicated by Cavendish, but it was especially after the experiments of Lord Raleigh in 1897 were completed, in which the quantity of nitric acid obtained bore a favorable relation to the amount of energy used, that the question was again taken up with renewed vigor in different countries. Thus, in 1900, Dougal and Howles made the attempt to manufacture nitric acid. In 1902 Kowalsky and Moszicki operated in Switzerland using an alternating current of 50,000 volts. At the same time Muthmann and Hofer were making trials in Germany. In United States a company was organized under the name of "The Atmospheric Products Company" with a capital of one million dollars, and which built a factory for the purpose of utilizing the power of the Niagara. This company, also known as the Lovejoy and Bradley company, used 10,000 volts direct current aros, and by this process could produce 70 per cent. nitric acid. The efficiency of the apparatus, that is, the output of the nitric acid per killowatt year power was good, and the acid was produced at a cost of a little less than 1.6 cent per pound for power or energy, using a current generated by Niagara water power at twenty dollars per year kilowatt. But the machinery was too costly to keep up to make it a paying investment, and in 1904 it failed and the attempt was abandoned. Pirot and Gay in France made attempts to bind the atmospheric nitrogen on a large scale in 1903 but failed in reaching practical results.

In Germany about the same time, 1903, the firm of Siemens and Halske in Berlin began operations, adopting Frank's method which consists in allowing pure nitrogen to act on alkali earth carbides. Calcium carbide, for instance, when heated moderately absorbs nitrogen forming a compound known as Calcium Cyanamid, also called "Lime Nitrogen" in commerce. This salt decomposes quickly in the soil to ammonia, etc., and has proven to be a good fertilizer, in some cases equal to Chili saltpeter, but whether by this method it shall be possible to produce the nitrogen compounds at low enough cost to be considered a practical success remains to be seen, or whether the cyanide salt can be used under all conditions, or whether it is harmless to plants at various stages of development.

Frank and Caro began experiments 1895 for preparation of carbides with a view to the manufacture of cyanides. First Barium, later Calcium, was used as the base, but instead of cyanide being produced, the product was the barium of calcium cyanamid (written $BaCN_2$ and $CaCN_2$) which yielded cyanides on fusion with alkali salts. Heated with water under high pressure calcium carbonate and ammonia were formed according to the following chemical equation: $CaCN_3+3H_2O=CaCO+2\ NH_3$. The better grade amids contained 14 to 32 per cent. nitrogen. By dissolving the cyanamide in water and crystalizing in the cold a dicyanamide $(CN^2H^2)^2$ with 66 per cent. nitrogen is formed. This Frank's method has been operated cheapest in Italy where cheap water power is available.

The latest and undoubtedly the most promising, and practically successful method in operation for oxidizing the atmospheric nitrogen, is the Birkeland and Eyde method now in operation at Notodden, Norway. The oxidation of the nitrogen is done in an arc produced by an alternating electric current of a very high voltage—5,000 volts—and a frequency of 50 periods per second. It is the peculiar structure or shape of the arc flame which gives it a great power for oxidizing nitrogen, and which phenomenon was observed by Birkeland and Eyde. It is the efficiency due to this peculiar shaped flame which makes it possible to utilize such arcs for the oxidation of the free nitrogen at low enough cost to make it pay commercially. The arc is namely made to flatten out into a thin disc-like flame by passing it through the field of a powerful direct current magnet, and it is the use of this arc flame for chemically uniting nitrogen and oxygen that has been patented and is now successfully used at the place mentioned. The electrodes are thin walled copper tubes about 1.5 c.m. diameter, and through which flows a current of water. The points of these electrodes come within 6 to 8 m.m. of each other, and the ends of the magnet come perpendicular to the electrodes, and a few inches apart. It is because of the action of the magnets, as well as the water flowing through the electrodes, that the latter are not melted in the high heat formed, but can carry the current for several days and nights before they need to be renewed. The magnet prevents short circuiting at the electrodes.

The reason why an arc of this disk-like shape is better and more efficient than the arcs used by Lovejoy and Bradley, and others, is, that it presents more heating surface with the same power than any other. For it is a question of how much gas can actually come in contact with the flame in a given time and be heated to the required temperature. The oven in which this arc-flame is generated has the shape of a cheese standing on edge, and is of considerable size, since the flame, formed by the electric current already mentioned, is six feet in diameter. On the other hand the flame is extremely thin (only a couple centimeters thick) so that while the inner chamber is a little over six feet one way, it is only a couple inches the other way. Around the flame is firebrick containing air channels and perforations through which the air current is forced into the flame, and is again collected into an outlet located close to the inlet opening. The air as it leaves the oven is highly colored on account of the nitrogen tetroxide ($NO_2$) fumes which are formed when the air leaves the oven. This thin arc flame has a temperature of about 3,000°C., but the gases as they leave the oven have a temperature of about 700°C. Air passes through the oven at the rate of 25,000 liters a minute, that is, in the three ovens at Notodden 75,000 liters (about 75,000 quarts) air are treated each minute.

At 3,200 degrees, absolute temperature, according to "Nernst," the formation of 5 per cent. nitric oxide (NO), by volume, should be possible. These ovens were tested with the following results: During several consecutive days and nights the gases leaving the oven were found to have a temperature of 700° C., and the nitric acid ($HNO_3$) obtained per liter gas, reduced to 0° and 760 m.m. pressure, was 30 milligrams. This corresponds to 1.06 per cent. nitric oxide by volume in the gas, which is equivalent to 4.58 per cent. nitric oxide (NO) by volume in the gas while it is exposed to the arc flame.

At the high temperature of the arc flame only nitric oxide is formed, the temperature is too high for nitrogen tetroxide ($NO_2$), and the nitrogen trioxide ($N_2O_3$) to exist. The nitric oxide which is formed and is present in the air as it leaves the oven must be oxidized to higher oxides. This oxidation takes place of its own accord in the presence of air ($NO+O=NO_2$), and the nitrogen tetroxide in the presence of water is changed into nitric and nitric acids, as shown by the following equation: $2\ NO_2+H_2O=HNO_3+HNO_2$. At the existing high temperature the nitrous acid is decomposed into nitric tetroxide, nitric oxide and water thus: $2HNO_2=NO_2+NO+H^2O$, and these residual gases must again be changed into nitric acid. A residue of gases is therefore always present.

Method of Changing the Nitric Oxide (NO) into the Marketable Products.—When the gas mixture leaves the oven it has a temperature of between 600 and 700° C. The hot gases, in order to utilize the heat they carry, are conducted through a steam boiler generating steam to be used later in the process. Here the gases are cooled down to about 200° C., and are next led through a cooling apparatus where they are reduced in temperature to about 50° C. From this cooling apparatus the gases enter a large iron tower or cylinder, called "oxidation cylinder," which is coated on the inside with a paint preparation which resists the acid. This cylinder holds about 12 cubic meters (about 15 cubic yards) and therefore gives the air a little time to oxidize; it being changed about 6 times a minute. Next the gas mixture passes in the absorption system which is composed of stone towers 2X2X10 meters inside diameter. There are two absorption systems in parallel at the factory. Each row or system is composed of two granite and two sandstone towers filled with quarts which is being drenched, or kept moist, by slowly trickling water, which takes up most of the nitric acid present in the air current. A fifth tower in each system or series is filled with ordinary bricks, which are kept moist with milk of lime. This lime takes up the rest of the nitric and nitrous acid gases, and forms calcium nitrate and calcium nitrite.

By a special arrangement of containers at the top and bottom of the towers, the acid liquid from tower number 4 is pumped to number 3, from 3 to 2, and so on, so that the strongest acid is in tower number 1. From there it is removed, having a strength of about 50 per cent. acid, and conducted to a row of open granite vats, where it is stored until needed for further treatment. A portion of this acid is used for breaking up the nitrite which accompanies the nitrate of lime in the fifth tower. By addition of nitric acid to the lime mass, containing both nitrate and nitrite of lime, in a closed vessel, the nitrites are broken up and the acid radicle set free and driven back to absorbers again. The reaction which takes place is as follows:

$Ca\ (NO_2)_2+2\ HNO_3=Ca\ (NO_3)_2+H_2O+NO_2+NO.$

The lime solution containing the pure calcium nitrate, plus nitric acid, is placed in other vats, mixed with the other acid and neturalized by adding limestone. This neutralized mass is then evaporated in iron vessels, down to a boiling point of 145° C., which is equivalent to a 75 to 80 per cent. concentration of calcium nitrate, or about 13.5 per cent. nitrogen in the mass. When this point of concentration is reached, it is poured into iron cylinders of about 200 liters (about 50 gallons) capacity and cooled. The solution solidifies into a pourous, easily pulverized mass which is ground up, packed in paper lined wooded boxes, and is then ready for the market. If the neutralized solution is concentrated to a boiling point of 120° C. it will crystallize, and the crystals, freed from the mother liquid by centrifugal force, are the pure calcium nitrate ($Ca(NO_3)_2=4H_2O$), the new nitrogen fertilizer.

This salt can be made into a basic salt, with excess of lime, having 8 to 9 per cent. nitrogen. This basic salt is not so hygroscopic but remains dry in the air, and is therefore undoubtedly more convenient for fertilizing purposes than the crystallized nitrate. But the other peculiar form of nitrate, containing about 13.5 per cent. nitrogen as already mentioned, is also less hygroscopic than the crystallized salt, can be handled and sown by machinery, and it is in this form that the new fertilizer appears in the market. By using sodium hydrate in the last absorption tower, instead of lime hydrate, a mixture of sodium nitrate and sodium nitrite is obtained, and 80 to 90 per cent. of the salt formed may be nitrite which will crystallize out almost pure. Thus a very valuable substance, $NaNO_2$, may be obtained as a by product. This sodium nitrite is used in making azocoloring stuff. The sodium nitrate can also be obtained from nitrate by melting it together with lead, according to the following reaction, $NaNO_3+Pb=NaNO_2+PbO$. The nitrogen can also be recovered from the sodium hydrate solution by treating it electrolytically. According to Cassel, the nitrates and nitrites both form ammonia which is driven over by boiling, and is caught in nitric acid thus forming ammonium nitrate.

Cost of Production and Capacity of the Establishment.—The Factory at Notodden, not far from Skien, Norway, was opened May 2, 1905, and has three electrical ovens each using 600 to 700 kilowatt current as being the most economical, although they can work with 1,000 killowatts each. The electric power is obtained from the power station at the waterfall Tinfos, where there is for industrial purposes a three phase generator of about 2,000 kilowatt capacity, and with a voltage of 5,000 between the phases. According to Dr. O. N. Witt, the cost per horse power per year at Notodden is about $3.00, or $4.02 per kilowatt, and that the possible production is 500 to 600 kilograms (1,100 to 1,320 lbs.) water free nitric acid per kilowatt year. The average daily output, however, is reckoned to be 1,500 kilograms (3,300 lbs.) water free nitric acid.

Comparing the cost of production at Notodden with that of the Lovejoy and Bradley Co., at Niagara we have: At Notodden one kilogram year power—$4.02. When 2,000 kilowatts are used the daily production of nitric acid is 3,300 lbs. (1,500 kgs.), or in other words, 600 lbs. water free acid are produced per kilowatt year at a cost of 4.02 dollars. One pound water free acid, according to that, costs 0.67 cent for power of production, and one pound 70 per cent. acid about half that amount. It is estimated that, at Niagara, it costs the Lovejoy and Bradley Co. 1.6 cent for power for one pound 70 per cent. nitric acid produced, when the kilowatt per year was 20.00 dollars. Besides having cheaper power at Notodden, than at Niagara, the machinery and apparatus are less costly in the Birkeland and Eyde method than in the Lovejoy and Bradley one, hence the success of the former process.

This new fertilizer which is called Calcium nitrate, also Lime nitrate, is not to be confounded with the substance called "Lime nitrogen" which is calcium cyanamid. The fertilizing quality of the calcium nitrate has been tested in different countries as Norway, Sweden, Denmark, Germany and France, by both pot and field experiments. The results of the experiments show that this nitrogen fertilizer is all that could possibly be expected of it. Its fertilizing value, pound for pound of nitrogen, was found to be equal to that of Chili saltpeter. In a number of cases where the soil was poor in lime it even surpassed the Chili saltpeter, and this is only reasonable to expect on account of the lime it added to the soil. A few experiments showed less increase in yield for the lime nitrate than for Chili saltpeter. It was tried with oats, barley, hay, beets, mustard, potatoes and other crops on a great variety of soils. If any particular kind of plants did show a greater liking for this material than the others, it was the mustard which in nearly every case gave much greater yield with calcium nitrate than with Chili saltpeter.

It can now be said: The nitrogen problem has been successfully solved, it remains only to develop large enough and numerous factories to supply the needed quantity.

The CHAIRMAN: A motion to adjourn will be in order.

MR. HUTCHISON: I move we adjourn until 7.30 this evening.

This motion was duly seconded, and the question having been put, it was agreed to.

The CHAIRMAN: The meeting stands adjourned until this evening.

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Thursday, January 23, 1908. 7.30 P. M.

Mr. Blyholder in the Chair.

The CHAIRMAN: The meeting will please come to order. Our first subject this evening is the report of the Committee on the Identification of Fruit. Dr. J. H. Funk is not present; I pass him. Is Mr. Boyer here?

MR. CLARK: I noticed him leaving the city with his traps. I think he has gone home.

The CHAIRMAN: Is Mr. Weidner here? If so, we shall be pleased to hear this report.

Mr. Weidner was present, and made the following report:

## REPORT OF COMMITTEE ON THE IDENTIFICATION OF FRUIT.

Your Committee reports as follows: Fourteen plates of apples were displayed on the Exhibition table:

Two plates York Imperial, 1 plate Jonathan, 1 plate Grimes Golden, 1 plate Mumper Pippin, 1 plate Ben Davis, 1 plate King.

The above-named varieties are fair specimens of good color and practically free from marks of scale and fungus disease.

One plate exhibited by H. C. Snavely, of Lebanon, to be named. This apple is worthy of special mention; an apple of good size, beautifully colored, long pendant stem, quality very good, sub-acid. Your Committee are unable to name the variety, but a specimen will be sent to the United States Pomologist for identification at Washington, D. C.

Five plates of Seedling apples, exhibited by Joel A. Herr, for name; some of these are worthy of trial, but the Committee have no names to suggest. One of these varieties shows very prominent marks of a fungus disease; this can be controlled by spraying with the Bordeaux mixture if done in season. Some of the specimens also show the presence of the San José Scale, which can be controlled with the lime-sulphur wash.

Respectfully submitted,

JOHN F. BOYER,
A. I. WEIDNER.

The CHAIRMAN: Gentlemen, you have heard the report of the Committee; what is the pleasure of the Board?

The SECRETARY: I move the report be received and adopted, and published with the proceedings of the Board.

This motion having been properly seconded, and the question put, it was so ordered.

The CHAIRMAN: We will next have the report of the Committee on Vegetables, by Mr. Herr.

MR. HERR: There being no vegetables, there is no report.

The SECRETARY: Were there none at the hotel?

MR. HERR: Not on exhibition. They were served on the table prepared to be eaten. If the Board wishes a report on them I can give it. Instead, I would say that the Memorial Committee is ready to report, if the Board is ready to hear it now.

The CHAIRMAN; We will listen to the report of the Memorial Committee.

MR. HERR, Chairman of the Memorial Committee, then read the following report:

## REPORT OF THE MEMORIAL COMMITTEE.

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### RESOLUTIONS RESPECTING PROF. GEO. C. BUTZ.

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WHEREAS: Prof. George C. Butz, whose untimely death occurred at State College on December 14, 1907, reminds us of the uncertainty of life, and to be also ready, while we bow in humble submission to Him whose ways are past finding out:

RESOLVED: That in the death of Prof. George C. Butz the Board of Agriculture has lost a valuable specialist, as Apiarist, whose reports were of great value to us and the State at large. We admired him for his faithfulness to duty to the Board, his friendly manner and cheerful disposition.

The State has lost a valuable Institute lecturer, whose work was greatly appreciated throughout the State, because of his knowledge of horticulture and floriculture, and his work in fruit growing. The College has lost a valuable Professor, whose work in teaching, bulletins and investigations, were valuable to the student body, as well as to the State at large, and we shall not soon see his like again.

RESOLVED: That a cepy of these Resolutions be sent to his family, and that they be spread upon the minutes of this meeting of the Board.

### RESOLUTIONS RESPECTING WILLIAM H. BROSIUS.

WHEREAS: God, in His wise providence, has seen fit to call to higher work our brother and fellow members in the State Board of Agriculture, Hon. William H. Brosius, member from Lancaster County.

RESOLVED, THEREFORE: that we bow in humble submission to Him who doeth all things well, and deeply sympathize with the family and friends of the deceased, and thereby express our sorrow in the loss we have sustained, and extend our sympathy to those bereft of a dear one.

RESOLVED: That a copy of these Resolutions be sent to the family of the deceased, and also be spread upon upon the minutes of the Board.

### RESOLUTIONS REPECTING R. H. THOMAS.

WHEREAS, Death has removed from us a veteran member of this Board (by appointment of the Governor), Col. Robert H. Thomas, of Mechanicsburg, Pa.,

THEREFORE BE IT RESOLVED: that in the death of Col. Thomas this Board has lost a member who when in health and strength, was a vigorous and fearless defender of the rights of the farmer, and an educator of great experience and force, and one whose influence was ever exerted to extend our power and efficiency.

RESOLVED: That our sympathy be extended to his bereaved family and friends.

RESOLVED: That a copy of these Resolutions be sent to the bereaved family and be spread upon the minutes of the Board.

### RESOLUTIONS RESPECTING FREDERICK JAEKEL.

Having learned of the death of Frederick Jaekel, member of this Board from Blair County, who died January 19, 1908, we desire to express our appreciation of the valuable services Mr. Jaekel has rendered to this Board, and to the Agriculture of the State.

Mr. Jaekel was kind and affable in disposition and manner, and was therefore a favorite among those associated with him. In his death this board has lost an efficient member, and his community and the Commonwealth have lost a good citizen.

We extend to the immediate friends and family of the deceased our heartfelt sympathy and direct that this tribute be spread upon the Journal of Proceedings, and that a copy be sent to the family of the deceased.

(Signed) J. A. HERR,
MATTHEW RODGERS,
J. NEWTON GLOVER,
Committee.

The CHAIRMAN: Gentlemen of the Board, you have heard these Resolutions; what is your pleasure?

The SECRETARY: I move the report be received and adopted as a whole.

MR. HUTCHISON: I second that motion.

The CHAIRMAN: Are there any remarks?

MR. HERR: I think it would be well to give the members an opportunity to make some remarks. Some one may be glad to say something about the valuable services of Prof. Butz, and some of the other members whom we have lost. I, myself, should like to say a few words about Mr. Jaekel. I have been acquainted with him ever since he became a member of this Board. He was a man who received most of his education in Germany. Coming to this country, he educated himself to become an attorney-at-law, and lived at Hollidaysburg, and later on at Altoona. I worked with him in Farmers' Institutes and what he knew he knew. He was a good, true man, who gave valuable service to the Board when he was active, and I can say the Board lost in him a valuable worker.

MR. HUTCHISON: Mr. Jaekel was my neighbor; I have known him as a neighbor, and I have known him in the Institute work. He was a German, had been educated in Germany, and had studied agriculture as practiced in his country, but his specialty was grapes. On that he was authority. He was a man who stood well in Blair County. His family, all but one son, has preceded him to the other shore. His wife was a sister of Mr. Blair, who makes these tablets that we use here and in the different departments. He was a nice man to have in the family, and I always liked him. As the years went by, he devoted less time to his law practice, and more to his farm. Both as a neighbor and a friend, I am sorry to lose him.

Col. Thomas was a good man, and was always of use to the farmers of Pennsylvania. I knew him actively as Secretary of the Pennsylvania State College. He never took a great deal of interest, or did a great deal of work in this department, but it was in his declining years that he was appointed, and he was an invalid for some years. But he always had the interest of the farmer at heart, and he always stood up for him and worked for him. He also stood high in other lines—in the editorial line, and in Masonry. He was a firm believer in God, and I believe tonight he is at rest with Him. Peace to his ashes!

The CHAIRMAN: Are there any further remarks? If not, all favoring the adoption of the Resolutions as offered, will please signify it by a rising vote.

These Resolutions were adopted by a rising vote of the entire Board.

The CHAIRMAN: We will now take up the next subject on the program, an address by Dr. Carl W. Gay on "Horse Breeding in Pennsylvania."

Dr. Day's address is as follows:

## HORSE BREEDING IN PENNSYLVANIA.

By DR. CARL W. GAY, *Philadelphia*.

The substance of what I have to say regarding this subject of horse breeding in Pennsylvania is simply this: Is it to our advantage to breed more and better horses in Pennsylvania? Now, my position in relation to this subject is somewhat unique. I hold a position created by the Pennsylvania Legislature, which is intended to encourage horse breeding in this state.

The first question that presents itself is, is it worth while to encourage horse breeding. Now, you must remember this: The work has already three instruments behind it to urge it on; the first is, the Breeders' Association; the second, the bill passed by the Legislature, and signed by the Governor, and the third, the creation of the position I hold, and my acceptance of it shows you what I believe in regard to the matter.

Now, what I have to say to you tonight is not to instruct you what to do, but I am here more in the search of information than anything else. With these three agencies of which I have spoken to help the work along, is it worth while to encourage horse breeding in Pennsylvania? It would be very improper for me, a stranger in the State, and so much your junior in years, to come here and tell you what to do, but I hope by what I have to say to excite a little discussion, and get your views. The stallion law that has been passed will not be able to accomplish anything without your co-operation, and I am here to try to enlist it.

In the first place, we know that there is only one state that has more horses than Pennsylvania, and that is New York, but when we take the United States' Hand Book, taking horses by counties, you find that Pennsylvania stands twelfth. Why is this? Because the larger proportion of our horses is in the cities. The proportion on the farms is so much smaller. There are eleven states that have more horses on the farm, and only one that has more in the cities. Now, horses in the country may be taken as the source of supply; horses in the cities may be taken as the basis of consumption. See the vast difference between consumption and supply here! See the great opening for the horse breeder here! We hear a great deal about home protective tariffs, and we see it carried out in other lines; but I don't know of any line to which it could be more profitably applied than to keeping in the state the money that is annually spent on horses, and letting other states take care of their own products.

The United States Department of Agriculture has compiled the average prices of the Omaha market from 1901 to 1906, taking the three standard horses, the coach horse, the draft horse, and the road horse—the draft horse leading in numbers; he has held closely to the average price of $150 as a minimum, and $295 as a maximum; the coach horse, less in numbers, minimum, $300, maximum, $750; road horses, $150 minimum, $375 maximum. This, it seems to me, simply shows that the horse market has been stable; that the prices it has shown within the last six years have been constant. Now, I could give you statistics that would show an average increase. In this state the average price is $109; this is an increase, because it is the average paid for farm horses. For instance, in Texas, which was formerly second, but is now third (Iowa is second, and Omaha first) the price has dropped. And here is the reason: there is no hay or grass for good pasture. A few years ago New York was one of the greatest hay producing states in the Union, and I think it is so yet. You put the average hay crop, and the average price of hay in two columns, and I think you will find them good wealth. The average New York farms would not pay for the buildings on them. Pennsylvania land, so far as the pasture is concerned, rises in value in proportion to the pasture. So eminent an authority as Sir Walter Bilbee of England, says that the limestone soil is of the greatest importance to the breeder. You take the Irish horses, especially the Irish hack horse; we all know what he is, and he is the product of the limestone. He is light and agile, and finely finished. The coarsest horses are produced on corn soil. Illinois leads in the production of corn, and it has the highest priced corn of any state, but its pasture produces the coarsest horses. When you talk about feeding and fattening horses for the market, then corn is a valuable factor in that discussion. So with the sheep land. I think that in the matter of pasture we can classify reasonably. Mr. Bradfute spoke this afternoon of the ideal, and I think it is well always to have that in view, and since I have been in the State I have tried to get an expression on that point.

I find in doing the county fairs that there is very often a mistake made in the classification. In some fairs there has been no attempt at classification, and in some there was in use the classification adopted by the State Breeders' Association, but the entries were not properly classified. It is a frequent thing to see horses that should have been classified under one head, in the other class; of course in the class they were they would not get a ribbon, whereas if they had been in their proper class they would have been representatives of their kind.

Now, in this regard another thing. In one of the counties a man showed horses, and he was very much displeased that they did not win a ribbon; he said he had been breeding this kind of horses for thirty years, and didn't want any one to tell him about horses. Now, the facts were these: he had a certain breed of horses, which had certain characteristics, which the breeders had been trying to eliminate for the past thirty years, and had nearly succeeded in eliminating. Now, the point was this: he had kept out of touch with the market for thirty years, and had lost sight of the standards, and he had the same horses today that he had thirty years ago, without a single improvement. Instead of keeping in touch with the market, and thoroughly conforming to it, he kept on breeding in his own way, and today his horses are not up to the standard that the market wants. If you have any market close to you, you will not sell any horses, no matter how good, unless you keep in touch with that market, and find out just what its standards are.

The markets of today recognize five grades—four classes and a misfit. The first is the draught horse, weighing from 1,600 to 2,000 pounds, the type is adapted for movement of the greatest possible loads, and not expected to move those loads very fast. Second, the coach horses, adapted for carriage work in the cities; third, general driver, and fourth, saddle horses. Now, the question arises, it seems to me, "which is the most profitable type for us to devote our energies to?" With most farmers the ordinary draught horse is the one preferred. Draught horses can be bred very well to do the ordinary farm work. You must raise the horses on the farm, and you should have the mares, and then you have the results to produce this class. But here comes in the question of variation in breeding, one of the most trying things a breeder has to contend with. We know the old maxim "like begets like," and the breeder often reasons on this basis only to be disappointed. He has reason to look for more than a good average, and he gets less than a good average. Now, if you will take a hundred draught colts, and compare them with any other kind, and you will find that they are more nearly what the breeder wants than any other kind of horses will be. They are generally put to breeding earlier, or if not that, they are put to work as two year old fillies. We don't do both. If we don't care to breed these colts, we make half horses of them; that is, we make them do half a day's work. It won't hurt them to work a little. Then, if you have left any stumpy ground, or anything else that may cause injuries, this class is much less apt to become injured than any other class, and even if they are injured, the injury is less than the other class or classes. Then there is always a market for this class of horses. There is no great demand in movement, but there is always a market for the good, steady draught horse. These, it seems to me, are five very good reasons for the breeding of draught horses. No man on the Allegheny mountains should try to breed draught horses. They can better be grown where everything is succulent, and a second crop of pasture for them.

There is no horse in the market for which there is such a steady demand as for the coach horse. In times of depression like this, there is no demand for draught horses. When business is not there, the draught horse is not wanted. In coach horses the chief difficulty seems to be to find a pair that will be harmonious in every particular. Only people who have tried this can tell, and this, I think, explains the difference between what is first paid for the horse, and the price at which he is finally sold. I have been trying for three months to get a coach pair, and I have gone the length and breadth of the State to look at many pairs, without finding what I was looking for. Most of these people thought they had exactly what would fill the requirements, but it only shows the great lack of information on the part of the farmer. Now, if a man has the proper fences, and does not work his mares too hard, and knows the standard of a good coach horse, this is the kind for which there is a steady demand at good prices.

Now, the next type I am afraid to discuss, for fear of being misunderstood. A horseman said to me last night that the trotter is the curse of every county that he has ever been taken into. I want to ask you how many men you know who have succeeded in making money as breeders of trotters? It is a rich man's business. When a man says they are farmer's horses, he doesn't know what he is talking about. They require too much finish, and too much hot blood to be of any use on the farm. The average man can use anything from a wagon horse, to a high class coach horse, but he does not want to handle stable horses. Up at State College a few weeks ago, the question was asked why, if the farmers in the West could make money on the stable horse, the farmers in the East could not do the same thing? Now, it seems to me that the answer is this. In the West weight is the standard. The precedent was established in 1851 in Ohio, and it was weight ever since. Two years previous (in 1849) in New York State was bred the first Hamiltonian sire, and he set the standard for speed in the East, so that today in the West weight is the standard; they breed horses that will weigh 3,200 pounds, and a few that will weigh 4,000 pounds; in the East, speed is the standard; this speed was set at 2.10, or something like that, and we have been trying to maintain or improve on that ever since. Draught horses are the product of the West, where weight is the standard; the speed horse is the craze with us, and that is the reason every farmer thinks he must go to breeding trotters. A man recently made the statement to me that New York is a veterinary hospital for sprains, ringbone, spavin and kindred diseases. They are not due to one generation, but it is the result of breeding these fine horses from one generation to another. They take the finely finished, hot-blodded speedy horse, and hitch him to the grocery wagon, and drive him with a heavy load over the mountainous roads of New York, and this ring-boned, spavined animal is the result.

Now that we have some idea of the correct type or types, How shall we get them? The first thing is the introduction of pure blood, and a gradual grading up to the ideal. If you doubt the efficiency of this, go into the Pan-handle district of Texas; ten or twelve years ago it would have been difficult to find anything different from what the packing houses designated as "cutters" and "canners." But since then Col. Slaughter and others have taken to Texas bulls that cost over $5,000 a piece. He first graded the cows on the ranches to this $5,000 bull, and then the calves are brought back to another $5,000 bull making them three-quarters pure bred. Now, it seems to me that this same rule will apply to Pennsylvania today, grading up and grading up to a higher standard from one generation to another. Now, in order to accomplish this, the first thing to do is for the men who own the mares to pay more when he goes to horses. The man who owns the horse will tell you, and with reason, that he can not afford to pay two thousand dollars for his horse, and then bring him here for a fee of ten dollars, and yet, that is all the average man is willing to pay. Now, it seems to me that that man should be willing to pay more for a better horse. He is getting the benefit of it in the grade of half pure blood that will raise the standard of his horses. I would like to hear this question of the grade thoroughly discussed. You have a law now in force in this state in reference to licensing the stallion. I don't know whether that law is as thoroughly understood as it should be. I get a great many letters in reference to it. For instance, I have a letter from a man in one of the Northeastern counties of the State, in which he says, "I have a horse that cost me $2,500; I ask $25 for service; my neighbor has a horse that he did not give anything for, and he asks $4.00 fee. Yet people are more willing to pay the $4.00 fee than to patronize my horse." Now, we are telling this man and that man what a grade horse is, and why we use him, that it is the key to the situation; that by means of it we propose to raise the standard of our horses. If I were to select a sire for my horse, I believe one of the first things I would look to is listed fees, and the first one I would investigate is the one with the highest fee within my means. I do not mean to say that a man is justified in paying a hundred dollar fee, but anything at ten dollars or over. Why, take the ten dollar fee: you are getting results that you can multiply by ten times ten dollars, and you are getting pretty near reaping a profit on that horse when he becomes a grade. And I believe that you can take every dollar you pay less than ten, and multiply it by ten, and it will represent the loss to you on that horse.

Now, in regard to this grade, why should we discriminate against him? I will eliminate one class of grade horses. In fact, there is only one kind of grade horse that I would consider: that is the horse that has stood in the community and has demonstrated his ability as a breeder. If he has demonstrated his capacity to get good grade sons, then I would not say anything against him, but there is no guarantee goes with him. Here comes in this principle of variation again. The horse that is only partially of superior blood may reproduce his inferior strain and characteristics in his progeny just as easily as he will the qualities that come to him from the other side. Now, the difference between grade and pure bred is simply this: the pure bred is a reproduction of the same good qualities from one generation to another, and you know what he is going to do; with the grade you have you have no assurance as to what he is going to do. Now, Mr. Bradfute about a year ago gave a definition of pedigree that I have never forgotten. It was simply this: that pedigree is a composite picture of ancestry. Now, as composite picture is one made of many. Now, if you have a pedigree, it is not only of the names, but of the type and characteristics of the ancestors, and where the ancestry is of a clear type, it is the picture of an individual. In the other breed you have a picture in which the individual predominates; it shows a little of the one side, and a little of the other. It is not a clear picture. Now, if you take these pictures at the same time, and under the same conditions, the pure breed will show the type and characteristics of the ancestry from which he has been bred while the other will not show up clearly. A clean pedigree will make a clean picture. The purebred has been re-inforced along that one particular type sixty-four times, and he becomes the expression of the type to which he has been bred. He simply leads the same physical life that has come down to him directly through the preceding generations, and when I see a pure bred horse, I am sure of uniformity.

The next thing to consider in a horse is soundness. Hock is one of the commonest forms of weakness in a horse. Very many horses are all right in every way, only weak in one leg, and the only way to eliminate this unsoundness is to take that horse out of the list of the breeders. I should qualify this, though, by saying hereditary unsoundness. Some of you may have known cases of unsoundness that, as the horsemen say, don't belong to the horse. A horse may receive a bruise or an injury, the results of which are noticeable in him, but which he will not transmit to his progeny; it is when that unsoundness becomes hereditary that we must eliminate it if we want to improve the breed of our horses. There is a great deal of misunderstanding in regard to the law as it relates to this very matter. I will take it up point by point, for I am assuming you are interested, and want this information. The law requires that every horse, whose services are offered to the public, must be enrolled with the State Livestock Sanitary Board. It does not mean in the Prothonotary's office. That comes later. The first thing to do is to have him enrolled with the State Livestock Sanitary Board, which then issues a license to the owner of the animal. These licenses are made out in three forms: they designate the horse as pure bred; as grade, or miscellaneous bred. When a man wants a license he must submit the pedigree of the horse, or the certificate from the association the horse is in. Now, a great many men don't like to surrender these pedigrees or certificates, because they cost them from three to five dollars, and they are not sure that they will get them back. You will get them back in as good order as you sent them. The thing for you to do is to send them by registered letter. This will show you that we received them, and we will guarantee to send them back in the same condition we received them. Now, if you can't show this pedigree, then your horse is called a grade. There is great disappointment among many owners that the grade is included at all; I receive a great many letters making complaint of this, but, gentlemen, don't you see that we cannot cover everything at once in the law? This act was simply a start, and we hope to improve it from time to time, making such amendments as are shown to be proper, until we have the law as we want it. Out in Wisconsin—this law is based on their law—there have been numerous amendments in the two years it has been in force. Things cannot be done in too radical a manner. Don't criticize the law for its imperfections yet; it has only gotten a start, and will be taken care of later.

Now, regarding the matter of the elimination of the unsound horse: when a horse is to be offered for public service, and the owner wants a license from the State Livestock Sanitary Board, his application must, as I said, be accompanied by the pedigree or certificate from the Association in which the horse is, and also by the certificate of a veterinary surgeon, or if that is not possible, by the owner's affidavit that the horse is free from all unsoundness. You may say we are running great risks in accepting the owners' affidavit, but you will notice that the form of the affidavit uses the words, "after diligent inquiry," and in the large majority of these cases the owner is honest in what he swears to; if he is not, we are very apt to learn it in some way very soon, and he makes himself liable to prosecution. Then, too, there are not many of these horses.

There is another type of superior horses, to which a certificate of approval is issued. This is in the manner of France, where they pay a subsidy for certain types of horses, and in cases where a horse is of superior type, and yet does not come under the subsidy act, he is given a certificate of approval. It is a high recommendation to breeders of the excellence of these horses. There will not be many of these certificates. It does eliminate the unsound horse, but it does not eliminate the grade horse who has demonstrated his superiority. It designates just what the horse is, and it is taken for granted that the man who presented him for license is honest; that he presented him in the right light, and will do what is right. Now, this is the law as it is in force at the present time.

Now, to come back to our subject, "Is it worth while to encourage horse breeding in Pennsylvania," I would simply say this: the figures seem to warrant it. I will not repeat them, but will only say that I spent a little time with the horsemen in Philadelphia last night, in order to get prices to use here to-night. There are many men, I was told, who would rather buy a horse in Pennsylvania than anywhere else, but they have not got the horses. "Why not?" I said. He said "they have not the stock, nor the blood. You may wonder why I buy my horses in Kentucky; I will tell you; they can guarantee their horses there; they know what they are breeding; here in Pennsylvania we have no guarantee." The conclusion, then would be simply this: it would be worth our while to encourage horse breeding in this state, impressing on the breeders first of all to breed in conformity to the market demands for these horses, and then breed a certain class of horses. If you will read the market quotations on horses, you will find that the lowest priced horse is the unclassified horse. So it seems to me that the first thing to do is to get our horses properly classified, and then introduce pure blood, until we get our standard up to the market demands; then there will be no trouble to find the market.

The CHAIRMAN: Gentlemen, you have heard this address; are there any remarks?

MR. McCLELLAN: I don't want to be understood as finding any fault with Dr. Gay's paper, but in our country the horse most in demand is the general purpose horse, weighing from 1,250 to 1,350 pounds—a horse that you can use for work, or for carriage purposes, and one that will do well on our hilly roads. We can't afford to keep a draught horse and a driving horse, and I can sell three or four general purpose horses to one draught horse. Then you take it this way; when times are dull in the State, there is no demand for draught horses. There is a demand for the general purpose horse.

There is no place in the United States that will outdistance Western Pennsylvania in the matter of horse breeding. At one time Westmoreland County was at the head. I remember forty-five years ago when it was at the very head of the horse business. Then it drifted across to Mercer, and I think I am safe in saying that Mercer has the lead today. In our county, when we want to get horses, we go across into Mercer, and today they are getting scarce there. I have seen the time when I could start out to buy a horse, and get a good one in two or three days. Now, they are hard to get at all, and when you do get one, you have to search for weeks before you find him.

Now, in regard to the unclassified horse, where do they come from? They come from too much trotting horse. Men start out to breed trotting horses, and out of every dozen they get one trotting horse, and eleven mongrels. It is either too much body, and not enough bone, or too much bone, and not enough body. I feel very much like the gentleman in Philadelphia, referred to by Dr. Gay, who said the trotters were the curse of every country they had ever been taken into. They do more harm than good. I have seen men start in to breed trotters thirty or thirty-five years ago, and they have never had a good horse since. They were not successful in breeding trotters, and they spoiled every other horse.

DR. GAY: In regard to the statement in reference to the general purpose horse, he is the toughest proposition we are up against at the county fairs. They want a horse that can be used for anything from the boys running for the doctor at night to doing the work of a draught horse. Now, this is the trouble. He comes under no particular classification, and it is the unclassified horse that is the lowest priced horse in the market. The market recognizes the utility horse as belonging to either one of these classes: laggers, feeders, chunks, expressers and wagon horses. Now, the expresser comes nearest to the general purpose horse; he runs about 1,250 pounds in weight, and about 16 hands high, but I do not think it would be wise in a breeder to breed too many of them. I should think the draught horse or the coach horse would be more to his advantage. But I think you said you were not in a horse county. Now, take the Chicago market; the expresser there does not cut much of a figure. As Jimmy Johnson of the Breeders' Gazette says, horses are classified according to their age: being first, horses as a whole, and then horses according to their work. A horse that has to haul a load of brewers' dry goods is not supposed to step as lightly or as rapidly as the one who does lighter work, and is lighter built.

MR. MARTIN: We are frequently asked by the farmer, "What particular mare should we keep on the farm to breed our horses to do our work?"

DR. GAY: Week before last I saw that the Kansas Board of Agriculture had this same question come up. There was a difference of opinion on this, and the question came up was the practical market for the draught horse in the city or country. Ex-Governor Gluck said he believed it was in the country. Then came the question, is the draught horse a typical farm horse? I would say "No." About a year ago we bought a draught horse for $375 for a class room type at the Ohio University. That horse was put to work regularly with three ether horses, working and plowing. The other three horses did their work better, were better on their legs, and stood the work better than did this horse. I believe the general opinion is that he belongs to the farm; that he can not keep his feet on the hard pavement of the city, but it is only the old story of the railroads over again. The wheels slid along the tracks until they learned to put on more iron. I would say that the draft horse belongs to the city, but he can be produced from the class of mares that can be used on the farm for ordinary farm work.

MR. COWAN: After thirty years handling of horses, buying, selling and breeding them, I have come to take exception to the statements generally made that it is to the sire we must look for the improvement of the breed. I think there is too little attention paid to the mare; that is a subject seldom touched upon. The discussions are always from the stallion standpoint. I am from Jefferson county, where we have a good many hills, and a few years ago there was something like over $30,000 expended to purchase stallions to help the farmers in that county in breeding horses. What have we today? Not to my knowledge, a single good horse from the entire lot. Was that the fault of the stallions? Not altogether, although many of the farmers think it was. Now, I have bred mares and I have bred stallions, and I have noticed that to get a better breed of horses we must improve our mares as well as our stallions. In our Breeders' Associations there are thousands of dollars spent for the improvement of the stallion, and practically nothing for the mare, but until we pay more attention to the mare we will not make much progress. I find that for my work, and for driving over the hills of Jefferson county, a horse weighing about 1,250 pounds is best. He dare not be too heavy to climb the steep hills.

MR. SCHWARZ: I don't know that it is necessary to give Mr. Cowan a character here. I had the pleasure of taking a ride with him behind those 1,200 pound horses of which he talks over those hills of Jefferson county, and there was no complaint due as to the way they covered the ground over those hills—particularly going down.

MR. MARTIN: You learned something about hills, there, did you not?

MR. CLARK: General Hancock, in speaking of the tariff said "that is a local affair." So it is with horse breeding. Each man desires what is best adapted to his county. Now, the horse that will do very well in the low limestone region is not likely to do so well in the high mountain region. On my farm we have some very fine 1,200 pound horses, which we think are about what we need. Brother Gooderham says that over in Cambria county they raise some horses, but they do not raise any Democrats. Now, in Westmoreland, we raise a little of both.

Now, the Doctor has spoken of the market type of horses. I believe that formerly the coach horse was of a better type than was the draught horse; but then, perhaps that was due to the people breeding the coach horse; they were all right.

I should simply like to ask one question: if the Agricultural Societies and the State Livestock Sanitary Board went hand in hand, would it not be possible to weed out the grade horse?

DR. GAY: I believe that eventually the livestock of the State will be all pure bred, but I do not think that the time is ripe just at the present to leave out the grade horse altogether, especially if he gets good sons. You cannot tell a man whose horse has done good service for six or eight years that he must take him out of service altogether simply because he is a grade. I do not want to be understood as saying that I am not in favor of eliminating the grade horse, but I think we must do it gradually.

Now, in regard to looking to the mare, rather than the sire for improving our blood, there is this one thing to take into consideration: Some horses get as high as fifty progeny in a year, while the mare only gets one, so while I by no means overlook the desirability of using good mares, I still lay most stress on the sire. You can get the same results so much more rapidly through the sire. The first thing is to introduce pure bred horses and use them with our ordinary mares, and then in time work up the mares to the standard which we are aiming at.

MR. HUTCHISON: I would like to ask the Doctor why it is that so many high priced horses, registered horses, I mean, that cost up to three thousand dollars or more, have very few progeny? I know of four horses that were brought into Blair county at a cost of over twelve thousand dollars that there are not half a dozen sons from. Why is this?

DR. GAY: That can be answered in a few words. There is no business, I believe, in which there is more trickery than in the horse business, and there is no part of it in which there is more fraud than in the high priced stallion business.

MR. HUTCHISON: These stallions were purchased by stock companies formed, and sold to the farmers in Huntingdon and Blair counties, and this practice is, in fact, going on today.

DR. GAY: Sterility is a long subject, and it may result in the male as well as in the female. If the horses are subject to law, as they now will be, it will go a long way toward overcoming this fault, although it is often due to the conditions surrounding the horse. In fact, no horse is as potent the first year as he is after he has become acclimated. Then another thing, they are pampered too much. The owner thinks he has paid too high a price for the animal to run any risks with him, and the result is that he is pampered too much for his own good, and for the owner's good. He does not get exercise enough. Now here is another thing to keep in mind: in going to get a horse, do not take one who has gotten only a few sons. Because a horse has a pedigree, and is sold at a high figure it does not follow that he is a getter of progeny. I know one horse that has stood any number of times. He is a pure bred, and a prize winner, but he is not a son getter. He has been sold any number of times. They sell him say at $4,000, with a guarantee; he does not make good, and is returned, and they sell him into another part of the country, but they do not allow you more than $2,000 for him when you return him. Of course, they are always willing to take him back.

Now, as to these stock companies, I think they are detrimental to the farmer. I have looked into them somewhat, and I think I am safe in saying that a horse that you pay three thousand dollars for in a stock company, you can get for fifteen hundred dollars if you buy him yourself. As a rule, when a man asks twenty-five hundred dollars for his horse, if you go after him yourself, and lay down your check for two thousand dollars, the horse is yours. If you buy through a salesman, you pay the twenty-five hundred. Of course, in the latter case you get your share of the horse for one hundred dollars, but I think in the long run you will get better results, and in that way get your money back, if you buy him yourself, and know what you are getting.

The SECRETARY: Don't you think that the high feeding of the colt for the purpose of exhibiting him at the shows may have something to do with the sterility?

DR. GAY: I know it. I would never buy an animal with a show record unless he has proven his worth as a sire before he was a show horse. Horsemen would rather get a horse direct from the farms in France, for breeding purposes, than one that has been exhibited at the shows.

The SECRETARY: Don't you think that if the growing colt were to be held down, it would be better? The horses out West don't get the development that the horses in Pennsylvania get, and in West Virginia.

DR. GAY: It may be; they get a grain feed, the highest carbonaceous ration. I don't think it is a question as to whether we can compete with the Western farmer. In South-western Kansas they raise horses averaging from 1,000 to 1,500 pounds. In summer they pasture them on alfalfa, and in winter they feed them on alfalfa hay. Now, we cannot compete with them in the cost of raising these horses, but when we take into consideration the freight rates they have to pay to get these horses into the Eastern market, I do not think we will fall very far behind. Still, it is not a question as to whether we can compete with these people, but whether we can make it to our own advantage to raise horses here for the market. I don't want to take up too much time, but Dr. Pearson suggests that one of our greatest faults is lack of stability in our efforts. Here is a man, for instance, who starts in breeding Percheron horses, and then comes along a man with a Belgian. Now, he may have bred the Percheron until his fillies are seven-eighths Percheron; then the next time he breeds to the Belgian, with the result that instead of his horses becoming pure bred, they go back to the nondescript class. If you want to breed a line, continue that line as soon as you make one cross you give an opportunity for this very variation that we are trying to eliminate.

MR. GLOVER: Will you please tell us the difference between the Belgian and the coach horse?

DR. GAY: The Belgian is the larger horse; he comes of the old Flanders blood, and represents the draught horse as closely as anything we have today, while the coach horse represents the best mixture of solid and light blood, never weighs over twelve hundred or twelve hundred and fifty pounds. You will find the average coach horses run 8-15 or 8-16, and weigh about twelve hundred and fifty pounds.

MR. COWAN: What we call the big little horse.

A Member: Do you consider the French or German the best breed or horses?

DR. GAY: It is the French horses I am speaking of. The German is more solid and heavy, and that is the reason the French is the better breed. In England they breed the English Hackney horse. have been breeding him since 1840 from the old Flanders mare, making him one-half blood; this gives him a little more time, a little more style. The German horse today is more of the old blood of the Belgian. I believe the place you can make your criticism of the German horse is right here. The average man gets the biggest horse of this breed he can get, and breeds him with a mare that he may perhaps have, thinking to get the heavy type in the progeny. But here is where the variation is likely to come in. Never breed a horse of that type to a mare that is as big as he is. If you take a German horse, take the smallest size, and breed away from the Dutchman's horse.

MR. COWAN: In selecting a sire, should you select the larger of the different types?

DR. GAY: My position always has been that if you give me the horse, first. I will give you the other things. Now, I would rather see a good little horse any time than a poor big horse. Now, the Englisman has set the standard for size, and the source of supply there is down in Lincolnshire where they can grow size; the Scotchman wants quality, and he grows it; he will take size with it if he can get it, but he will take quality first, and I would say that this is my position; give me the horse first, and I will get the other things.

MR. BRADFUTE: May I say a few words. Now, it seems to me that in breeding livestock it is a mistake when we do not follow our stock to market. We breed along a particular line, and may continue to improve that line, and so long as we keep our stock at home, this is all right, but we should follow it to market, and see what the other fellow wants. He buys our horses or our cattle, and we should study his wants. Now, if a man can go to market, he will hear the criticisms that are made on his horse, and he will find why it did not bring as much money as he thought it ought to bring. He will see the good points of the other horses that do bring the price, and I sincerely think it is the best thing a man can do to follow his horse to market. A man may be prejudiced in favor of a certain horse, by reason of the personal interest he takes in him; he has raised him from a colt, and there is a friendship between them. Now, the buyer is influenced by no such sentimental reasons, and the breeder may learn some things in that way that are to his advantage. I remember my first experience in selling draft horses. The man came to buy, and I led out the pair to the roadside. He asked me my price for them as a pair, and also single. I told him $400 for the pair, or $200 single. He said "I will give you $200 for this one, but not for the other one." I said "why, my dear fellow, the other horse is far the more valuable; we have worked him, and he has justified our faith in him, and have found him, in fact, the better horse." He said "I can't give you over $175 for that horse; the other $25 you ask for him is all love and affection, and I can't pay you for that." Then I let go my love and affection and sold that horse. Now, find out what the other fellow wants, and don't let your love and affection stand in your way, no matter what branch of the livestock business you are in.

MR. PETERS: I have heard a good deal of talk about horses here this evening, and I would say that if a man wants to breed trotting horses, let him breed trotting horses, and nothing else. Let him find out what he wants to breed, and then stick to that.

MR. McCLELLAN: I just want to add a word to what I said. Conditions change, and I am not a breeder of horses to any extent, but I would say that the horse most demanded in any particular locality is the horse to breed there.

Another thing that came into my mind when I heard the answer to Mr. Hutchison's question is, that this is the reason that so many undesirable and unproductive horses come to the Eastern states. They are sent in opposite directions when they are sold the second or third time. I emphasize the fact that one wanting a good horse should go and select that horse himself. By buying from peddlers you pay 33 1-3 per cent. more for the same animal, than you do otherwise. They must figure the traveling expenses of the man and the horse, and you foot the bill. Another thing; if the peddler is unable to sell a horse, he will generally go into some community and offer some reputable farmer two or three, or even four or five shares of stock, if he will form a company and buy that horse.

DR. GAY: I may be out of order, but there is one thing I should like to speak about yet. I am not a member of this Board, but I am deeply interested in the livestock of Pennsylvania, and I would like to say just a word about Mr. Bradfute, who has come to us from another state to talk to us about livestock. It occurs to me that perhaps the majority of the people here do not know how high he stands. If there has been any reference to this, I have not heard it. I have not been present through the entire session of the Board. Many men come here and talk about the upbuilding of the farmers' interests, who say a great deal, and do nothing. I know men who write a great deal about cattle farming, who know absolutely nothing about it by practical experience. It is all theory with them. I am prompted to make these remarks because this afternoon after Mr. Bradfute spoke, a great many men asked me "who is he, and what does he do?" and when he was through they said "he evidently knows what he is talking about." So I should like to tell a few of the things he has done. His Angus breed is unexcelled by any one in this country; he is the man who bred the bull for which W. D. McHenry of Duncan, Iowa, paid $25,000; he bred "Lucius Prince," for three successive years Champion of the breed at the Chicago show. Another bull bred by Mr. Bradfute has been a prize winner several times in succession, and he is considered by many judges as the best bull bred with the exception of the one that won the Grand Championship. If these things had been known before he spoke, I think they might have created a little more interest. I make these remarks, not as a member of the Board, but simply to show that I am much pleased to have Mr. Bradfute here with us.

MR. HUTCHISON: I move that we extend a vote of thanks to Mr. Bradfute and the other speakers who have addressed us.

This motion having been properly seconded, it was so ordered.

The SECRETARY: I want to say that I agree with Dr. Gay in his estimate of Mr. Bradfute, but I should like to add that when a man is asked to come here and address this Board there is little danger that he has not the right kind of a pedigree. In the making up of the program the present Secretary has made it a practice to get here none but men who have established a widespread reputation as authorities on their respective subjects. We had heard most excellent reports of Mr. Bradfute before he came here, and I am glad to say we were not disappointed when he came among us.

MR. HERR: I am glad the Secretary made this speech. I wanted to do it. We can always depend on our Secretary to get us the very best. I hope the time will come when we will not have to send to New York or Ohio to get the best, but when we can produce men right here in Pennsylvania who can go outside right into the other states, and teach the heathen there.

MR. HUTCHISON: We have said nice things about Mr. Bradfute, and I think we should now, as a Board, welcome Dr. Gay. I think he will "make good" as the saying goes.

MR. HERR: Perhaps Mr. Hutchison will tell us what he is doing here.

MR. HUTCHISON: He is here as a representative of the State Livestock Sanitary Board. We have heard a great deal about him. We came pretty near getting him at State College, but Dr. Pearson got ahead of us; he had a line out for him before he was suggested for State College. Now, I'll tell you what to do; go up to State College during Farmers' Week, and try to start a State Fair. That will help some of us old fellows. We have a lot of good men up there at State College—Dr. Hunt, Prof. Agee, and a lot of others. Don't fail to go up there next time they have Farmers' Week. It will pay you.

The CHAIRMAN: Any others that would like to say a few words before we close?

MR. COWAN: I was interested in the talk by our brother from Ohio. To show you how they do things out there: a man from Ohio bought a horse in Pittsburg, and some one told him I had bred that horse, so he came to see me about it; he said he could not give that horse a character until he knew who bred him and all about him. He wanted me to go to Ohio with him and see the horse, but I told him I had not raised it, but that if anyone around Brookfield had done so, I would find out about him and let him know. He said he would never offer him for sale until he could certify him. This goes to show you that the people of Ohio are honest even when it comes down to a horse trade, where, we have been told, there is more trickery than in any other business.

The CHAIRMAN: We should like to have the pleasure of listening to a few remarks from Dr. Frear this evening.

DR. FREAR: Mr. President, Ladies and Gentlemen of the Board: I had expected to have the pleasure of addressing you last night on the seed subject, but it is a subject that requires pretty careful preparation, and I am having a pretty hard time of it just now. As you know, the Board is looking after the matter of the violations of the Pure Food Law, and I am frequently called upon to testify in regard to the subject. The consequence was that when I was to read this paper, I found I had to be on the stand giving expert testimony in a case of this kind.

I learned more about horses tonight than I ever knew before. I don't think I have learned enough to qualify as an expert, but it seems to me that with most men it is with their horses as it is with their wives: each man has, or thinks he has, the best, and he would not care to change.

I want to say, further, that I believe that the Board has reason to congratulate itself on the progress it has been making. I believe that the meetings of the last decade grow in interest and in profit from year to year. It is a good strong work, that will in time bring about its own recognition.

I thank you for the privilege of saying these few words.

The CHAIRMAN: Any further remarks?

MR. CLARK: The Doctor just expressed a thought that was brought out quite clearly here tonight. Each man thinks his horse, as he thinks his wife, the best for him. It reminds me of something that happened when I was a boy: It was the habit of the men in the neighborhood to gather at the store in the evening to talk over matters. One night the Presbyterian minister was among them, sitting on the counter. They were discussing pretty women, and he said "It would never do for us all to think alike; if we did you would all have wanted to marry my wife." Now, most of them did not agree with him regarding that, but no one said anything except an Irishman by the name of Bond; he said "I agree with you there; because if everybody thought as I did, nobody would have wanted her."

The CHAIRMAN: That brings us to the end of the program of 44 numbers. I know you will agree with me that we have had a most inspiring meeting, and I trust we will all meet together again at the next meeting. We would like to see you all in the Western part of the State, so that you may know what we are doing out there.

MR. COWAN: I move we adjourn.

MR. HUTCHISON: I second the motion.

The question having been put, it was agreed to, and the Board adjourned to meet at New Castle at the call of the Secretary.

N. B. Critchfield

Secretary.